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# CROP EXPERIMENTS,

# BOMBAY PRESIDENCY,

# 1895-96.

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No. $\frac{A}{8876}$ OF 1896.

FROM

J. W. P. MUIR-MACKENZIE, ESQUIRE, I.C.S., M.R.A.C.,
Officiating Survey Commissioner and Director,
Land Records and Agriculture, Bombay;

To

J. MONTEATH, ESQUIRE, I.C.S.,
Acting Chief Secretary to Government,
Revenue Department, Bombay.

*Poona, 10th December 1896.*

SIR,

I have the honour to forward the Analysis of Crop Experiments, made in 1895-96, at about the same date as that on which the report was ready last year. The Analysis is the joint work of Messrs. Seddon and Mollison.

2. The table given below exhibits the extent of work done:—

| Division. | 1893-94. | | 1894-95. | | 1895-96. | |
|---|---|---|---|---|---|---|
| | Reported. | Rejected. | Reported. | Rejected. | Reported. | Rejected. |
| Northern Division ... ... | 44 | 1 | 37 | 3 | *30 | 4 |
| Central Division ... ... ... | 45 | 20 | 56 | 12 | 45 | 8 |
| Southern Division ... ... | 45 | 2 | 41 | 3 | 42 | 3 |
| Total ... | 134 | 23 | 134 | 18 | 117 | 15 |

* Exclusive of the 149 experiments of Surat on which a separate report has been submitted.

Of the gross number of experiments made, 4 were performed by Survey officers, and 7 by Superintendents, Land Records and Agriculture. The Superintendent of the Southern Division contributes three experiments for the first time.

3. In preparation for the quinquennial return of yield statistics all experiments are "ordinary", *i.e.*, no attempt is made to study the general profits of agriculture by including in the scope of an experiment all the crops of an individual holding.

4. For some years, chiefly with reference again to the quinquennial return, an effort has been made to indicate the crops on which tests should be made in each district.

A statement is appended, which shows what crops were actually tested and which of them will find entry in the quinquennial return, the latter being marked with an asterisk :—

| Division. | *Jowári. | *Bájri. | *Rice. | *Wheat. | *Harik. | *Nágli. | Tur. | *Gram. | *Sugarcane. | *Sesamum. | *Linseed. | *Rapeseed. | Nigerseed. | *Groundnut. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern Division ... | ... | 7 | 8 | 5 | 1 | ... | 2 | 3 | 1 | 2 | .. | 1 | ... | ... | 30 |
| Central Division ... | 13 | 6 | 1 | 10 | ... | 2 | 1 | 4 | ... | 3 | 2 | ... | ... | 3 | 45 |
| Southern Division ... | 7 | 2 | 9 | 5 | 1 | 2 | 2 | 7 | ... | ... | 3 | ... | 4 | ... | 42 |
| Total ... | 20 | 15 | 18 | 20 | 2 | 4 | 5 | 14 | 1 | 5 | 5 | 1 | 4 | 3 | 117 |

## NORTHERN DIVISION.

5. The number of experiments conducted in the Northern Division is about the same as last year, the bulk being taken on *bájri*, wheat and rice.

6. Mr. Mead appears to have conducted a careful experiment (No. 3) upon sugarcane, Mr. Pherozsháh Pestonji has again distinguished himself by the ability and thoroughness with which he has reported five interesting experiments (Nos. 19—23), and Mr. Moore conducted a careful test (No. 27) on rice in the Thána district. The work of other experimenters hardly rose above the usual level. In Ahmadabad the District Deputy Collector, Mr. Jethálál Varajbhái, appears to have bestowed singularly little pains on this part of his work.

7. Mr. Pherozsháh's two experiments on rice (Nos. 19 and 20) seem to indicate that the assessment on lands under this crop in the district of Broach is not likely to prove excessive, a point upon which the special experiments, which it is hoped to undertake next year in this district, may be expected to throw light. The garden land (Exp. No. 22) tested by this officer which bore an assessment of Rs. 10-14-6 seems to be by no means over-rated, since the incidence of the assessment in a year when only a *bájri* crop was taken to rest the land does not exceed 23 per cent. Obviously in ordinary years when valuable garden crops are grown, the incidence will be far lighter.

8. I agree with Mr. Patvardhan that some inquiry is advisable regarding the apparently heavy incidence of the assessment on the *harik* land which forms the subject of Experiment No. 30. Possibly during the fallow years the land yields valuable crops of grass.

## CENTRAL DIVISION.

9. The total number of reported experiments is considerably less than either last year or the year before, a fact which is to be regretted. The percentage of rejections is about the same. Mr. Mollison had doubts about the acceptance of some experiments (Nos. 36—38) reported by Mr. DuBoulay. These experiments referred to very low yields. The direction is that only crops representing an average of the season shall be selected. So far as can be gathered, the yield of the season was a low one in the tract selected by Mr. DuBoulay for experiment, and the tests, therefore, were legitimate. They give an indication, not without value, of the extent to which the assessment presses on cultivators in a poor season.

10. Mr. Cursetji's careful experiment (No. 73) on groundnut in the Sátára district is of considerable interest. He places the cost of cultivation at a tolerably high figure, giving the cultivator, however, on his 8-anna crop, a profit of Rs. 8 per acre out of a gross outturn Rs. 72-5-2; in other words of 11 per cent., the incidence of the assessment being only 4 per cent. The cost of cultivation, having regard to the high manuring of the land, is probably not under-estimated. The general conclusion is that groundnut is a decidedly profitable crop.

11. Still more interesting perhaps are the results of this careful experimenter's test (No. 75) on *Shálu jowári* which coincide with those of another shrewd observer Mr. F. B. Young in Ahmadnagar. In these two instances good black soil with irrigational advantages yields crops worth 50 to 100 times the assessment. Even with the addition of the water charge the Sátára crop was worth thirty-three times the assessment, and yielded a profit of Rs. 49 per acre. The assessment in the Nagar crop (Exp. No. 56) included the charge for water. Facts like these suggest reflections whether the richer soils of the Deccan when provided with water have not escaped too easily in the recent revisions. It is difficult to credit the correctness of the statement reported by Mr. Young that the extraordinarily valuable land on which he has reported should be mortgaged for the insignificant sum of Rs. 300. The terms on which the wheat and safflower field experimented on by this officer are held, appear much more probable.

12. The three officers alluded to in the last three paragraphs deserve acknowledgment for the care and interest bestowed by them on the experiments which they have reported.

13. At page 19 of the Analysis Mr. Mollison draws attention to the tendency which experimenters show to regard a 16-anna crop not as an average,

but as a bumper crop. It cannot be too often impressed on experimenters that, whatever the local practice in their districts, or the villages they select for experiment, yet for purposes of their reports, and in order to obtain a uniform basis of comparison, the average crop is to be represented by 16 annas.

SOUTHERN DIVISION.

14. The number of tests and percentage of rejections is practically the same as last year.

15. Again in the Southern Marátha Country the incidence of assessment is shown to be generally low. The apparent exceptions are cases where the crop taken is one of several grown on the land, and the yield therefore does not represent the total gross outturn. A particularly noteworthy instance of this is Mr. Lushington's experiment (No. 84) on *tur*. Here the assessment is shown at 77 per cent. of the yield of a good crop. This mode of exhibiting the facts is completely misleading. Without knowledge of the yield of the principal crop it is impossible to estimate the incidence of the assessment; all that this experiment shows is that by means of the subordinate crop the cultivator managed to more than clear his assessment, leaving himself clear the profits from the principal crop.

16. The table of average incidence on dry-crop land in the Bijápur district given at page 35 of the Analysis will be of interest.

17. The best work in this division seems to have been done by Messrs. Artál, Kelkar and McNeill. Mr. Pánse also bestowed much pains on his experiments.

18. The special experiments in the Surat district have been made the subject of a separate report.

I have the honour to be,

Sir,

Your most obedient Servant,

J. W. P. MUIR-MACKENZIE,

Officiating Survey Commissioner and Director.
Land Records and Agriculture.

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# ANALYSIS OF CROP EXPERIMENTS.

## NORTHERN DIVISION.

### Ahmadabad.

Rice, *juvár*, wheat, gram, *bájri* and sugarcane were selected for tests in this district, and experimenters were asked to choose one or other of these. Mr. Robertson has submitted two tests on rice, Mr. Mead one on sugarcane, and the District Deputy Collector three on wheat. Mr. Robertson did one more test in *juvár*, but the results being unsatisfactory, he did not report it.

*Mr. L. Robertson, Assistant Collector.*

Two experiments are submitted. They are very unsatisfactory, and I include them with some hesitation. The report was submitted by Mr. Mead, who has apparently prepared it from Mr. Robertson's notes. The samples received in this office are stated to have measured 1½ *ser* each. One bag was found to contain 56½ *tolas* and the other 50 *tolas*, giving a deficit of 3½ and 10 *tolas* respectively. This throws considerable doubt on the correctness of the figures recorded.

The rice is in both cases *Sutarsál* rice. The first field (Exp. No. 1) is said to be *káli* (black) soil and the second (Exp. No. 2) *kiári* (rice) land. Both fields are close together. The second field is classed as Rice land and assessed at Rs. 4-3-9 per acre. The first field is classed as Jiráyat at Rs. 2-10-6 per acre and was converted into Rice some five years ago. They both grow rice invariably without a second crop. Mr. Robertson thought the crops good average ones for the year. The season was bad owing to deficient late rain. I have no doubt the outturn is much below the average of favourable years. The first field is said to have an 8 to 10-anna crop, the second a 12-anna one. The first field got about 7 and the second 4 loads of manure per acre.

Outturn, &c., was :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 1 ... | 8 to 10 | 429 | 2,200 | 13 10 5 | 2 10 6 | 19·45 |
| Do. No. 2 ... | 12 | 774 | 3,250 | 23 11 9 | 4 3 9 | 17·84 |

*Mr. P. J. Mead, Assistant Collector,*

Sends in an experiment (No. 3) on sugarcane. The field is Jiráyat *gorádu* soil, assessed at Rs. 11 for 4 acres 34 gunthas or Rs. 2-4-3 per acre. The variety of cane grown is *Dholi Sherdi* or white cane. The field belongs to a Bania, who sublets it to a cultivator for Rs. 40 plus 1 maund of *gol* when sugarcane is grown. Of the whole field 1 acre 2 gunthas was planted with cane, and the experimenter tested a patch of 8 gunthas. Mr. Mead must have taken a good deal of trouble over it.

The well, a two-bag (*kos*) one, belongs to the Bania, who charged nothing for it. It also irrigates another field. The plough and cattle used belong to the cultivator. The season is described as fair, but there was not enough rain, and the cultivation as very fair; and the anna estimate is given as 12. For the 42 gunthas of land 45 carts of manure are said to have been applied. Some

castor cake also was applied, but Mr. Mead's remark about this is not understood. He says: "70 maunds of *erandi* crop refuse not made up into cakes with *máti*, because the soil is not sandy." A reference has not explained the matter, as Mr. Mead thinks it is quite clear. About 30,476 sets are said to have been planted per acre by being pressed into flooded ground. This is a high seed-rate. Mr. Mead says the crop was planted in August or September, but this must be a mistake, as it was cut at the end of January and sugarcane takes about a year to grow. The mill used was a three-roller wooden one worked by two pairs of oxen. It is said to be worth Rs. 75 and to last a year. Its hire, including boiling pan, juice-receiver, &c., is Rs. 3 a day, which seems a high rate. There are 15 such mills in Dholka.

Mr. Mead gives an estimate of the cost of cultivation. I fear it is somewhat too vague and several of the items are liable to very obvious objections, and certain expenses have not been allowed for.

However I append it:—

| | Rs. | a. | p. | |
|---|---|---|---|---|
| Rent ... ... ... ... | 8 | 10 | 6 | + 1 maund Gol. |
| Manuring 1st time ... ... ... | 32 | 0 | 0 | |
| „ 2nd „ ... ... ... | 35 | 0 | 0 | |
| Seed ... ... ... ... | 72 | 0 | 0 | |
| Weeding and planting ... ... | 15 | 0 | 0 | |
| Tying canes together... ... ... | 17 | 0 | 0 | |
| Puggis to keep off jackals ... ... | 10 | 0 | 0 | + ½ maund Gol. |
| Repair of Bándh ... ... ... | 4 | 0 | 0 | |
| Hire of mill (5 days) ... ... ... | 15 | 0 | 0 | |
| Bullocks for work (Re. 1 per *kothi—25 *kothis* to the acre) ... ... ... | 26 | 0 | 0 | |
| Digging pits for mill and furnace... ... | 5 | 0 | 0 | |
| Fuel (*tuver* stalks) ... ... ... | 12 | 8 | 0 | |
| Labour (5 days) ... ... ... | 29 | 3 | 0 | |

I cannot follow Mr. Mead in his detailed estimate for labour, or quite understand how the exact sum of Rs. 29-3-0 is obtained. The total expenses thus estimated come to Rs. 281-5-6 plus 1½ maunds of *gol* for the 1 acre 2 gunthas. Of the crop the experimenter says there were better sugarcane fields in the district, but none were available for experiment.

*Gol* is priced at Rs. 3-8-0 per maund or 11 lbs. 28 *tolas* per rupee. This seems astonishingly high, and I cannot help thinking there is some mistake. Mr. Mead says the price one day was Rs. 3-12-0 and another day Rs. 3-8-0 per maund, corresponding to 11 lbs. 28 *tolas* and 10 lbs. 37 *tolas* per rupee.

Outturn details are:—

| | Per 2 Gunthas. | Per Acre. |
|---|---|---|
| Number of canes ... ... ... | 7,181 | 35,905 |
| | Lbs. | Lbs. |
| Weight of canes ... ... ... | 7,398¼ | 36,992 |
| „ of juice ... ... ... | 4,845 | 24,225 |
| „ Gol ... ... ... | 882¼ | 4,411 |
| | Rs. a. p. | Rs. a. p. |
| Value of Gol (at the high price quoted) ... | 75 4 3 | 376 5 3 |
| Incidence of assessment ... ... | 0·60 | per cent. |
| Percentage juice to cane ... ... | 65·48 | „ |
| „ Gol to juice ... ... | 18·21 | „ |
| „ Gol to cane ... ... | 11·92 | „ |

*Mr. Jethálál Varajbhái, District Deputy Collector,*

Sends in three experiments (Nos. 4 to 6) on wheat. He has not offered a single remark to explain his figures. The season is said to have been unfavourable owing to insufficient rain, and the cultivation indifferent. How the cultivation was indifferent is not stated, except that there was no manure applied. The soil is black soil. The experimenter says that the soil is never manured, as it is in itself rich and its richness is sometimes assisted by the flood water spreading

* Bullocks are hired at Re. 1 for each *kothi* (juice-receiver) filled. Five *kothis* of juice were got from 8 gunthas.

over the soil and depositing manuring ingredients. All three crops are estimated at 8 annas. All three fields are in the same village and grow the same crops—wheat, cotton and *juvár*.

I tabulate the results :—

| | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | Principal Product. | By-Product. | | | |
| | Lbs. | Lbs. | Rs a. p. | Rs. a. p. | |
| Experiment No. 4 ... | 138 | 164 | 4 11 6 | 1 12 6 | 37·74 |
| Do. No. 5 ... | 218 | 128 | 7 11 10 | 1 15 4 | 25·30 |
| Do. No. 6 ... | 242 | 246 | 8 14 7 | 1 8 8 | 17·29 |

The seed-rate is given in each case as 51 lbs. per acre, apparently from general enquiries. The variety of wheat of the first test is red *kátha* valued at 32 *sers* per rupee, and of the two other white, valued at 29 *sers* per rupee. According to the formulæ the outturn of the first test represents a 2-anna crop and of the others a 3 to 4-anna crop. It is impossible to consider these crops as representative. The experimenter appears to have got through his experiments as quickly and easily as possible.

## Kaira.

The Sub-Divisional Officers were asked to make three experiments each, at least two of which to be on *bájri*; other crops to be selected to be *kodra*, *rági*, gram and sugarcane in the order given. There was no Assistant Collector when the *bájri*, *kodra* and *rági* were being reaped. Mr. Doderet therefore made two experiments on *tuver*. The District Deputy Collector has submitted four tests on *bájri*.

*Mr. W. Doderet, Assistant Collector,*

Finding himself unable to act according to instructions, cut two *tuver* crops. Both the fields (Exp. Nos. 7 and 8) had *kodra* as well as *tuver*. The *kodra* was reaped at Diváli time. There is no indication of the value of the *kodra* reaped. Both fields are of *gorádu* Jiráyat soil, fairly heavily assessed. The first field had no manure. The second was lightly dressed with cow-dung at the rate of 3½ loads per acre put on in June. The seed-rate is worked out to 4⅓ lbs. of *tuver* per acre. Ten local *sers* of mixed *kodra* and *tuver* are drilled per Bigha of 23 gunthas, the proportion of *tuver* to *kodra* being as 1 to 3.

The results are thus shown :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 7 ... | 14 | 549 | 390 chaff.<br>1,170 sticks. | 17 2 0 | 4 12 9 | 28·01 |
| Do. No. 8 ... | 16 | 772 | 595 chaff.<br>1,040 sticks. | 23 8 6 | 6 5 11 | 27·07 |

Mr. Doderet cut separate patches to ensure getting a fair average. The first field grows *bájri*, *juvár*, *bávto*, &c., and the second the same crops and tobacco. Both crops suffered from the failure of the late rains. The percentage incidence is in each case on the *tuver* alone.

*Mr. B. E. Modi, District Deputy Collector,*

Submits four tests on *bájri*. In each case the crop experimented upon was as usual grown mixed with pulses. The principal crop only was in each case tested. The season was in at least three cases decidedly unfavourable for *bájri*. The subordinate pulses, though not tested, are reported to have been comparatively poor crops. Mr. Modi's experiments throw no light on the incidence of assessment. Each field has *gorádu* soil. There is very little variation in the assessment exigible. It varies between fields from Rs. 4-9-2 to Rs. 4-14-9 per acre.

The first field experimented upon (No. 9) grew in 1893-94 sugarcane, which was rather heavily manured. *Bájri* and wheat, each unmanured, were grown in 1894-95. This year the *bájri* had subordinate to it *math* and *guvár* and was manured at the rate of 6 loads of ordinary manure per acre. The tillage is described as good. The crop was hastened to maturity owing to want of rain. The seed was drilled at the end of June and the crop was harvested at the end of September. The *math* and *guvár* were only middling. The *bájri* yielded 608 lbs. grain and 2,667 lbs. useful by-product together worth Rs. 22-12-3 per acre. This is estimated as a 14-anna outturn. The incidence of assessment works out 20·98 per cent.

The second experiment (No. 10) gave very poor results. The field was last manured in 1893. It grows *bájri* with subordinate pulses every year. This year *math*, *mag*, *chola* and *guvár* were grown mixed with the cereal. The seed was drilled on the 20th July very late in the season. The *bajri* was reaped on the 12th October. It yielded only 174 lbs. of grain and 631 lbs. of useful by-product together worth Rs. 7-0-9 per acre. The incidence of assessment is 68·07 per cent. There is no doubt that the lateness of sowing and the scant rainfall in September had a disastrous effect on the outturn, which I think is very much over-estimated at 10 annas.

The third and fourth fields experimented upon by this officer gave miserably poor results. Mr. Modi would have been well advised to have left such fields alone. In each case the cultivation is described as indifferent, and in each field sowing was belated. Neither field was manured for the crops tested. The subordinate pulses were in each field *math* and *guvar*. The pulses were expected to yield fairly well. The incidence of assessment on the gross value of *bájri* works out 138·70 per cent. for the third field and 92·01 per cent. for the fourth. The figures of these two tests are not entered in the tabulated statement of results.

## Panch Maha'ls.

The Assistant Collector was asked to conduct three experiments on *bájri* and two on wheat. Three on *bájri* were done but only one on wheat. Mr. Wales was hampered during the wheat harvest by threatened disturbances at Shera. The District Deputy Collector was asked to do three experiments on gram and three on rape-seed. Mr. Jivanlál did three on the former but only one on the latter as he could not find it unmixed with other crops.

*Mr. J. A. G. Wales, Assistant Collector,*

Sends three experiments (Nos. 11—13) on *bájri*. The remarks are rather meagre. All three experiments were taken in the same táluka and two of them at the village of Isrodia on the same day. All three fields are of *gorádu* soil. Prices of produce are the same; 30 lbs. *bájri* to the rupee and 25 lbs. chaff and 100 bundles or 200 lbs. straw to the rupee. The price of the by-products is taken at much too high a figure. The chaff is valued dearer weight for weight than the grain and its value exceeds Rs. 9 per acre in the first test. At Godhra, where the first experiment was taken, the rainfall was latterly deficient and the crop suffered. At Isrodia the season is said to have been satisfactory as far as rain was concerned. Probably the later rainfall was short there too. In the second and third experiments the anna valuation is given as 8. As the season is said to have been satisfactory and the cultivation good and a fair amount of manure was applied, it is not clearly understood why the crop is estimated as only a half crop.

All the fields were manured at the rates of 9, 6⅔ and 10½ cart-loads respectively per acre. Seed was twice sown in the first and third fields and it is presumed that the seed-rates given are for the double application, but Mr. Wales does not clearly say. The second field was only once sown and the high rate of

seed, over 51 lbs. per acre, is certainly an exaggeration, and the experimenter does not himself believe it to be correct. All the fields had subordinate crops, but they were not tested. In the first field the seed was broad-casted, in the other two drilled. Mr. Wales calculates from the seed-rates, that in the first field out of 10 gunthas $7\frac{1}{2}$ were *bájri*, $1\frac{7}{8}$ *tuver* and $\frac{5}{8}$ *math*; in the second out of 12 gunthas, *math* and *mag* occupied $\frac{12}{31}$ guntha; in the third out of 10 gunthas *math* occupied $1\frac{2}{23}$, brinjals and chillies $\frac{5}{23}$. All these calculations depend for their correctness on the assumption that a given quantity of seed occupies a constant space no matter what sort of seed it is, an assumption which of course is not correct.

Outturn, &c., figures per acre are :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 11... | 12 | 709 | 228 chaff ... 2,000 straw ... | 42 11 10 | 1 2 1 | 2·65 |
| Do. No. 12... | 8 | 199 | 75 chaff ... 728 straw ... | 13 4 4 | 0 13 4 | 6·13 |
| Do. No. 13... | 8 | 464 | 144 chaff ... 1,264 straw ... | 27 14 9 | 1 6 8 | 5·08 |

In each case the incidence of assessment is very low.

Mr. Wales also sends one experiment (No. 14) on wheat. The wheat is an inferior kind and is grown as a second crop after rice. The soil is said to be stony, but what there is besides stones is not stated. The field grows rice followed by a second crop as a rule. Before the rice it was well manured with 27 cart-loads of farmyard manure per acre. The rainfall was deficient, but the cultivation good. The wheat is said to have been sown broad-cast in January. I should imagine this is a mistake, as the rice must have been harvested in October or November and the soil must have been quite dry by January. Straw and chaff are not valued because 'they are not offered for sale in the Bazár.' Yet things which are not offered for sale may have a value, and here the by-products are useful and should have been valued.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Potcentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 14 ... | 8 | 506 | 932 straw 137 chaff. | 17 7 2 | 1 13 5 | 10·54 |

The grain is valued at 29 lbs. per rupee. The incidence of assessment very low for a second crop only, would have been still lower had the by-products been valued.

*Mr. Jivanlál Pránjivandás, District Deputy Collector,*

Conducted four tests, one on rape-seed and three on gram, which, however, have been submitted by Mr. Heblikar, who resumed charge of his office on return from leave.

It was found difficult to find rape-seed as a sole crop. This oil-seed is generally in the district grown in rows subordinate to gram or some other rabi crop. All the crops tested were second crops after maize, and although the season was not quite favourable, the incidences shown are so moderate that the

burden of assessment must necessarily be very light. The fields selected for experiment have each *gorádu bhuri*, light brown, soil.

The rape-seed field (Exp. No. 15) bears an assessment of only Re. 0-15-9 per acre and grows two crops every year, maize or rice as a rain crop, gram and rape-seed in the rabi season. The kharif crop was this year manured with 10 loads per acre of cow-dung. Season and tillage are each described as good. The rape-seed was sown through a seed tube fixed behind a plough in November and produced a crop ripe about the end of February, which was estimated at the maximum standard and yielded 441 lbs. oil-seed per acre, worth with the by-product Rs. 23-5-6. The incidence works out 4·21 per cent. only, which, if the occupant's interest only is considered, is extremely satisfactory.

The gram fields tested (Nos. 16—18) did not yield so well. The outturn results are very uniform, and the assessment exigible from each field does not vary much. The respective assessments are Re. 1-3-2, Re. 1-3-9 and Re. 1-9-11 per acre. The season is described as below average and the cultivation indifferent in each case. Maize, the kharif crop on each field, was manured in each case with 8 loads cow-dung per acre. One crop was tested on the 24th February, the other two on the following day, each in a different village. The seed-rate of the first field, 25 lbs. per acre, is under average. The seed-rates of the other two fields, 51 and 48 lbs. per acre, are probably about right. The gram was sown in the same way as the rape-seed.

Outturn, &c., results are as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 16 ... | 16 | 349 | 492 | 9 4 0 | 1 3 2 | 12·95 |
| Do. No. 17 .. | 15 | 359 | 428 | 9 6 4 | 1 3 9 | 13·13 |
| Do. No. 18 ... | 11 | 333 | 256 | 8 8 3 | 1 9 11 | 19·02 |

## Broach.

The programme for this district has been fully worked out. Mr. Pherozsháh submits 2 tests on rice, 1 on *bájri* and 1 on sesamum. Second crop in one of the rice fields has also been experimented upon. The results have, as usual, been very carefully reported. Mr. Sorábsháh did one test each on rice, *bájri*, sesamum and cotton.

*Mr. Pherozsháh Pestonji, District Deputy Collector,*

Submits in all five experiments. Two are on rice, one on mixed wheat and *vál*, a second crop on the second rice field ; the fourth experiment was on *bájri* and the fifth on sesamum. The experiments are exceedingly well reported, information of considerable value being given in a concise and clear manner.

The rice experiments (Nos. 19 and 20) may, with advantage, be contrasted. The two principal varieties of this officer's charge were selected, *Sukhvel*, a fine late ripening variety, and *Jádu Sáliu*, a coarse early ripening sort, the cultivation of which is much more extensive. A second crop is not usually got after the first variety, but is commonly taken after the second if late rains are favourable. Mr. Pherozsháh took the trouble to test the second crop of wheat and *vál* grown on the coarse rice field, and therefore we have, at hand, the information necessary to give a fair idea of the burden of assessment on each field.

The *Sukhvel* rice field belongs to a Koli. It extends to 19 gunthas and bears a consolidated charge of Rs. 7-10-1 per acre for soil and tank water assistance. The Koli purchased the field five years ago for Rs. 100 and got it in a neglected state. He restored the bunds and liberally each year manured the field, and now is rewarded by a considerably increased outturn. The rice field lies close to the tank and this year got a full supply of water even though the rainfall was deficient and the tank has silted up. *Sukhvel* rice requires water

till late in the season. The crop tested did not ripen until the 10th of December. The cultivation is described as excellent. The occupant has a good many cattle and can usually collect about 100 loads of manure annually, all of which goes to his rice land, which extends to about 2½ acres. The field tested got 30 loads for 19 gunthas. The crop was grown from transplanted seedlings; 2½ gunthas of seed-bed to 19 gunthas of field, 90 lbs. of seed being required per acre of transplantation. *Sukhvel* rice is in great demand. It is bought up by Broach merchants. Mr. Pherozsháh says the average dry-crop rate at Kátpore is about Rs. 4-8-0 per acre. The comparison between this and the rates for rice land is very favourable to the latter, especially as there is cheap and easy communication with Broach, the principal market of the district. Mr. Pherozsháh says the assessment for rice land in other parts of his charge is 50 per cent. higher and "that seems the right pitch."

Mr. Pherozsháh selected at Chorási a field growing *Jádu Sáliu* rice. The field is owned by a Pátidár, who during the last three years has let it to a Káchia. The tenant bears all charges except assessment and gives the owner half the produce. This is known as the *adh* system of tenantry. "The field lies in the way of flood waters discharged from the lands of the neighbouring villages and for this advantage a consolidated rate equal to Rs. 10-3-0 an acre was fixed at the original survey. It is much higher than that at Kátpore and there is this further drawback that the supply of water cannot be regulated according to requirements. After heavy and continuous rainfall the water stagnates in the field for a long period to the detriment of the crop, and when there is any prolonged break no water at all is available. Although *Jádu Sáliu* is a hardy plant, it must necessarily suffer to some extent under alternating deficiency and excess of moisture."

The rains were deficient, and the tested crop is reported to have yielded only about ⅔rd of the average outturn. The cultivation was fairly good. The tenant has only one pair of bullocks and bought in another village 24 loads of cattle manure which he applied to the field, 1 acre 13 gunthas. The crop was grown from transplanted seedlings raised in rich land near the town site, Rs. 2 being paid for the right of sowing 1 maund of seed and taking the seedlings produced therefrom. The seed-rate for an acre of transplantation works out to 55 lbs. The experimenter was unable by enquiry to find out why the seed-rate for *Sukhvel* and *Jádu Sáliu* varies so much.

Wheat usually follows rice in the field referred to above, unless as in 1894 the late rains are scant. The October rains of 1895 favoured the sowing of a second crop, and wheat and *vál* (Exp. No. 21) were sown mixed. The tenant did not expect a good crop owing to scant late rainfall. I do not think, however, that there could have been much deficiency of moisture in the soil because the crop took nearly five months to ripen. Weeding was neglected and the experimenter says weeds choked the wheat and gram. Under the circumstances the outturn is as good as could reasonably have been expected. Wheat and *vál* were worth about 25 per cent. more than usual, and the by-products were also considerably dearer than in ordinary season.

I tabulate the results from the two rice fields as under :—

| | Crop. | Anna Estimate. | Outturn per Acre. Principal Product. | Outturn per Acre. By-Product. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|---|
| | | As. | Lbs. | Lbs. | Rs. a p. | Rs. a p. | |
| Experiment No. 19 ... ... | Sukhvel rice ... | 20 | 3,445 | 5,575 | 126 5 0 | 7 10 1 | 6·04 |
| Do. No. 20 ... ... | Jadu Sáliu rice ... ... | 10 | 1,670 | 3,935 | 16 0 6 | | |
| Do. No. 21 ... | Wheat ... | 10 | 410 | 490 | 23 7 9 | 10 3 0 | 13·88 |
| | Vál ... ... | 6 | 105 | 110 | 3 13 0 | | |
| | | | | | 73 5 3 | | |

I think it is probable that the crops of the Chorási field should each bear higher anna estimates.

The *bájri* tested by this officer (Exp. No. 22) yielded well. The field has superior order Garden soil and is irrigable from a well having an abundant supply of good water. The number extends to 2 acres 8 gunthas. The well irrigates this and other adjoining land, in all 6 acres 13 gunthas. The well and the whole area irrigated by it belong to a Pársi. The cultivator is a Bohora and gives the Pársi Rs. 110 rent or Rs. 17-5-0 per acre, the Government assessment being Rs. 10-14-0. The field experimented upon grows sugarcane, onions, sweet potatoes, rice, &c., but in order to rest the land from irrigation a dry crop is grown on a portion of the number annually. Sometimes the dry crop is *bájri*, sometimes *juvár*. The *bájri* this year occupied about half the number. Manure was not given, nor is it usual to manure such land when a dry crop is grown, because land which grows garden crops is invariably maintained at a high state of fertility. Rain was deficient in September: therefore the crop was once irrigated in that month.

Outturn, &c., results are as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 22 ... | 18 | 1,205 | 3,010 | 46 14 0 | 10 14 6 | 23·26 |

Although the incidence of assessment appears high, I do not think that the burden of assessment is heavy.

I quote almost verbatim the experimenter's remarks about his fifth experiment (No. 23) on *tal* : " Like *bajri*, *tal* is rarely grown for its own sake in my charge. It is resorted to for the purpose of resting land for cotton. The crop, which for this purpose usually rotates with cotton, is *láng*, but the latter only thrives in low-lying damp soil, and on high ground its place is taken by *tal* or *juvár*."

The holder of the field is a Kanbi woman from whom it has been rented for the last 5 years by a Koli at the rate of Rs. 10 per acre per annum. The tenant has no land of his own, but he cultivates in all about 12 acres of land rented from other occupants. He has one bullock only and gets another for ploughing, &c., from another man similarly circumstanced, the advantage being reciprocated.

The field appeared clean and well cared for : the tenant had evidently taken much pains with it. The season was, however, unfavourable owing to scant rainfall, and the outturn was therefore poor. The tenant earned but little more than the rent charge, but, as already stated, *tal* is not the rent-paying crop of the land and the season was against any fair outturn.

The field has good black soil assessed at Rs. 4-10-2 per acre The crop only yielded 150 lbs. seed worth Rs. 11-13-0 per acre. This is called an 8-anna crop. Incidence works out 39·51 per cent.

*Mr. Sorábsháh Hormasji, District Deputy Collector,*

Forwards four experiments, one on rice, one on *bájri*, one on sesamum and one on cotton.

The experiment (No. 24) on rice is of doubtful utility. The rice is drilled and is followed by a rabi crop of wheat or *juvár*. This year's crop is estimated at 4 annas. Outturn is 246 lbs. paddy and 779 lbs. straw per acre, and the value of the yield of the single crop not much more than half the Government assessment.

The *bájri* crop (Exp. No. 25) was a good one. The *bájri* suffered from want of rain, but this crop is said to be a 20-anna one. The estimate is probably wrong and it should be 14 or at most 16. Fifty loads of manure are said to have been applied to the land under *bájri* (1 acre 1 guntha). I have no doubt that this is a very considerable exaggeration. Seed-rate is rather high, 10¼ lbs. per acre. *Bájri* is priced rather high, 28½ lbs. per rupee. *Bájri* straw is

valued much lower than rice straw; the latter indeed seems to be priced too high at rather less than 3 cwts., say 320 lbs. per rupee. The outturn of *bájri* comes to 1,350 lbs. and straw 2,195 lbs. valued at Rs. 51-4-8. Incidence of assessment comes to 26·82 per cent. Mr. Sorábsháh Hormasji has in both cases calculated the incidences upside down, that is, by dividing the yield by the assessment instead of *vice versâ*.

Both these experiments were made in the same village and on the same day. The soil is in each case called by the experimenter *gorádu*, and he says the whole village is assessed as Garden land. The fact is that the land is alluvial soil, or Bhátha, similar to the lands on the north bank of the Tápti at Surat. The village of Borbhátha is almost entirely composed of alluvial deposits from the Narbada.

The sesamum tested (Exp. No. 26) grew on light, *gorádu*, soil assessed at Rs. 5-5-10 per acre. The season was poor owing to deficient rainfall, and the anna estimate is 8. No manure was applied this year. Some was put on last year. The field is under a sesamum cotton rotation and the cultivator says sesamum is a good preparation for cotton—no doubt true. Seed-rate per acre is given as 9¾ *tolas* or ¼lb. This I think must be too little, though the quantity of seed sown for this crop is very small. The field was well-tilled, seed was sown by a drill in August. The owner stated that he ploughed his field seven times and weeded it thrice. Mr. Sorábsháh says that the average yield of sesamum is about 6 maunds per acre or double this year's produce.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn of Seed per Acre. | Value of Outturn | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | As. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 26 ... | 8 | 131 | 11 0 0 | 5 5 10 | 48·76 |

This officer's last test was taken on cotton growing on a field of *gorádu* soil assessed at Rs. 7-11-10 per acre. Mr. Sorábsháh says this was an average field for the locality and year. He says the field is stated to yield 295 lbs. cotton in an average year and therefore calculates the anna valuation at 20. This is, in my opinion, undoubtedly too high, as the crop is stated to have suffered from the holding off of the rain in September. The field grows cotton, with occasional crops of *bájri*, *math*, *tuver* and *kodra*. No manure was applied this year, but is said to have been well manured before last year's crop. Mr. Sorábsháh allowed the Mámlatdár to superintend the pickings, and for this reason the experiment is not entered in the tabulated statement of results. The orders of Government are that crop experiments are to be done by officers not inferior in rank to Deputy Collectors.

Cotton is sold by the *bhár*, which in Broach is a weight of 20 *dhadis* of 48 *sers*, each *ser* weighing 40 *tolas*. Pickings on the 10 gunthas are thus shown :—

| Date. | Local. | Rate per Bhár. | Value. |
|---|---|---|---|
| | Srs. ts. | Rs. | Rs. a. p. |
| 4th January ... ... | 18 35 | 96 | 1 14 2 |
| 13th do. ... ... | 13 0 | 100 | 1 9 0 |
| 22nd do. ... ... | 10 15 | 96 | 1 0 7 |
| 3rd February ... ... | 10 25 | 96 | 1 1 0 |
| 13th do. ... ... | 18 0 | 95 | 1 12 6 |
| 26th do. ... ... | 14 5 | 83 | 1 5 8 |
| 11th March ... ... | 1 22 | 82 | 0 2 1 |
| Total ... | 88 22 | ... | 8 13 0 |

The price of cotton sustained a sudden and severe drop about 25th February. The acre outturn is 363 lbs. seed cotton, valued at Rs. 35-4-2, giving an incidence of assessment of 21·94 per cent. Seed-rate was about 6 lbs. per acre.

Of 100 *tolas* of seed cotton kept for test the constituent parts were :—

| | Tolas. |
|---|---|
| Lint ... ... ... ... | 38 |
| Seed ... ... ... ... | 61 |
| Waste ... ... ... ... | 1 |

## Surat.

Special arrangements were made to carry out experiments on an extensive scale in this district, and in all 149 experiments were carried out. These have been analysed by Mr. Seddon and are separately printed and attached to this report.

## Tha'na.

Experiments on rice, *kodra*, sesamum and gram were ordered from this district. Four tests in rice have been reported; 1 by Mr. Moore, 1 by Mr. Clements and 2 by Mr. Patvardhan. The last named officer did also one test in *kodra*. The explanations offered by these officers for not doing the full number have been regarded by the Collector as satisfactory.

*Mr. R. A. L. Moore, Assistant Collector,*

Reports a careful experiment (No. 27) on rice. The field grows rice every year, but no second crop. It belongs to a pleader who bought it from a Mussalman four years ago. It is sublet to a tenant who has cultivated the number for the last three years. He pays in kind, giving 23 *pharas* of rice in husk annually, *i.e.* 1,564 local measure *sers* of (about) 39½ *tolas* each. This payment was equal to 23 per cent. of the total produce of the field this year. The pleader pays Government assessment Rs. 19-7-6 and local cess Rs. 1-3-5 = Rs. 20-10-11. The difference between this and the value of the payment in kind was this year Rs. 11-14-2, which represents clear profit on the number, which is, exclusive of *Pot Kharáb*, 3 acres 28 gunthas in extent. The season was favourable; the rains in November did no harm, as the field lies high. The crop was estimated locally as an average one. The seed-bed was manured with dry fish (*kuta*), but no manure was applied to the field. The area of seed-bed to acre of transplantation could not be determined; but the seed-rate is reported as 46⅓ lbs. per acre. The seed was sown in June and the seedlings transplanted in July. The crop ripened in November and yielded 1,819 lbs. grain and 116 head-loads of straw per acre, together worth Rs. 42-0-11. The crop was believed to be above the average of the village, but Mr. Moore's choice of fields was limited, as a good deal of rice had been cut when the test was taken. The incidence 12·50 per cent. is moderate.

*Mr. E. Clements, Assistant Collector,*

Sends one experiment on rice. The variety is *Garva Kolumba*. The soil is first order black, locally known as *revás*, growing rice every year. The season is said to be good but not so good as 1894. The outturn is said to represent a 16-anna crop, but it is so high that I think there must have been an error in the experimenter's calculations. The crop is reported to have yielded 2,900 lbs. of clean rice per acre and nearly 14,000 lbs. of straw. I doubt very much whether the finest possible crop of rice could yield so much straw. The cleaned rice is valued at the exceedingly cheap rate of 54¾ lbs. per rupee, and the by-product at the extravagantly high rate of over Rs. 34 per acre. The sample of grain sent to my office was unhusked, and I think it is probable that the outturn reported is that of unhusked grain. Mr. Clements says the Taláti was ordered to select two or three average fields and this being near the camp was finally selected. A little over 12 gunthas had been left uncut (the field measured 1 acre 35¾ gunthas), and out of this the test area of 8 gunthas was selected. The experimenter further says: "The part chosen was slightly better soil and with more water than the rest of the field." Probably also the crop was better than in the rest of the field. In any case it is very doubtful whether the test area was average for the rest of the field. The experiment is not reported.

*Mr. V. R. Patvardhan, District Deputy Collector,*

Submits three tests, two on rice and one on *harik*.

The two experiments (Nos. 28 and 29) on rice were taken at the same place and on the same day. Both fields have black Kharif soil, and grow rice every year.

The first field grew *Halvi Patni* rice. The cultivation and season are described as good. Six loads of cow-dung and six of dried grass were put on the seven gunthas of seed-bed for ráb and 69 lbs. of seed were broad-casted on it to supply one acre of transplantation. The rice is valued at 44⅓ lbs. per rupee and the straw at 6$\frac{6}{7}$ cwts.

In the second experiment the variety is *Halva Kolambya* valued at the high rate of 34⅕ lbs. per rupee. Straw is valued only at 8$\frac{2}{7}$ cwts. per rupee, being coarser and eaten only by buffaloes. The cultivation is described as very good and 62 lbs. of seed were put on 3 gunthas of rábed seed-bed for one acre; three loads of cow-dung and three of dried grass formed the ráb material. It is not quite clear why so little as 3 gunthas was enough for the acre here while seven were required in the case of the first experiment.

I show the outturn figures :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 28 ... | 16 | 1,606 | 1,910 | 38 12 0 | 3 7 0 | 8·87 |
| Do. No. 29 ... | 18 | 2,310 | 3,500 | 70 2 6 | 3 11 8 | 5·31 |

In both cases the incidence is very low.

The third experiment (No. 30) is on *harik* or *kodra*, also done on the same day and at the same village. The land appears to be somewhat highly assessed at Rs. 3-7-0 per acre. The experimenter says: "The land selected for experiment is a Kharif land, but is not so rich as to produce rice or any other better crop. It is full of *murum* and is not suitable for any other crop except the one under experiment. It has been under cultivation for the last three years with this crop only. It will have to lie fallow for about eight to ten years. No other crop is said to have even been grown before on this land." No manure was applied. Seed-rate is given as 51 lbs. per acre, which is nearly six times the formulæ rate, and is probably exaggerated. Yield is 1,551 lbs. grain and 2,475 straw valued at Rs. 11-14-0. Incidence comes to 28·94 per cent. Even if we suppose the three years' yield to be worth Rs. 50 and only eight years' fallow to be given, it is difficult to see how the land can possibly pay.

The crop is estimated at 18 annas and is very nearly double the maximum crop of the formulæ. Both grain and straw are valued at an extremely cheap rate, 137$\frac{4}{5}$ lbs. and 35⅓ cwts. respectively per rupee. The by-product, however, is often not valued at all. It is used largely for ráb.

Of *harik* (or *kodra*) Mr. Patvardhan says: "A few cultivators grow this corn for their own consumption and generally not for sale. It is not consumed immediately after it is harvested. It is stored and kept in receptacle with its mouth shut. This crop is used when the cultivators feel needy after washing it to take away its intoxicating properties. It is mixed with rice when eaten. It is used only by the lower classes."

# CENTRAL DIVISION.

## Kha'ndesh.

Each of the five district officers was asked to conduct four experiments, two on *bájri*, one on sesamum and one on wheat if possible. Mr. DuBoulay carried out the programme and did two extra tests on wheat. Mr. Bomanji did only two on wheat. Mr. Hatch carried out the programme. Mr. Shitárám Dámodar carried out two tests on *bájri* and one on sesamum, but the results are not reported for reasons given further on. Mr. Lallubhái Gordhandás conducted two *bájri* experiments, but did not report them owing to unsatisfactory results. Later on he was prevented through illness to carry out sesamum and wheat tests.

Mr. F B. Young, Superintendent, Land Records and Agriculture, C. D., sent in two *jowári* tests from this district.

*Mr. K. R. Bomanji, Assistant Collector,*

Sends two tests (Nos. 31 and 32) on dry-crop wheat, *gore gahu*, in the Sindkheda táluka. They are estimated as 8-anna crops, and the season was bad owing to lack of rain. The soil is black soil with an admixture of sand, and the fields grow *bájri*, cotton, wheat, linseed and sesamum. The tests were both taken on the same day and at the same village. The first field was unmanured, it is manured once in three years, and the second is said to have had 19 cart-loads per acre of manure put on before sowing. Mr. Bomanji doubts this and so do I. Some of the manure is said to have been homestead, and the rest purchased at annas 8 per load. Mr. Bomanji thinks the man may remember correctly what he purchased, but cannot be sure about the amount of his own manure. The man certainly may remember, but he may perhaps not be truthful. As for the effect of the manure, Mr. Bomanji says: "The Khátedár explained that it proved a bad year for the application of manure. The soil, he says, required greater moisture by reason of its being manured; that moisture being wanting, the soil proved, in his words, *too hot* for the crop. Not being a practical agriculturist, I refrain from hazarding any opinion about it." There is a certain amount of truth in the cultivator's statement. The manure applied would undoubtedly have proved more effective if the soil had remained moist during the whole period of growth.

Outturn, &c., results per acre are :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 31 ... .. | 8 | 342 | 766 | 11 2 5 | 2 11 1 | 24·14 |
| " No. 32 ... .. | 8 | 356 | 923 | 12 0 6 | 2 14 1 | 23·93 |

*Mr. J. H. DuBoulay, Assistant Collector,*

Submits one test (No. 33) on sesamum and two (Nos. 34 and 35) on *bájri*, all taken on the same day on fields apparently close together in the same village. The sesamum was decidedly a poor crop and the *bájri* crops were each comparatively poor. The experimenter says: "The selection of crops was a matter of some difficulty this year; the rainfall has been everywhere in the Pimpalner táluka scanty, and so capricious that even in one village some crops have proved almost total failures; whilst in another field the same crop has yielded results below the average, but still not bad. The crops selected were good representatives of the more successful fields."

The sesamum was threshed after nine days' and the *bájri* after two days' exposure to the sun. Mr. DuBoulay did not see the crops threshed owing to pressure of work; he deputed a clerk, in whom he had confidence, to do the work.

Each field tested has poor light soil, the sesamum field being the poorest. Crops on this description of soil would readily fail in a year of deficient rainfall. The fields grow cotton on occasion, but the principal crops are *bájri* and *til*. *Bájri* fields were lightly manured before sowing with sheep manure. *Til* was sown seasonably in July, but *bájri* later than usual in August.

I tabulate outturn, &c., results as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 33 ... ... | 8 | 61 | ... | 3 5 4 | 0 5 9 | 10·78 |
| „ No. 34 ... ... | 6 | 302 | 800 | 7 8 0 | 0 7 1 | 5·90 |
| „ No. 35 ... ... | 4 | 318 | 800 | 7 8 7 | 0 6 9 | 5·59 |

The *til* anna estimate is probably too high and the *bájri* estimates too low. The results are indicative of what poor soil in an unfavourable season will produce.

Mr. DuBoulay also submits three dry-crop wheat experiments (Nos. 36—38) from the Sháháda táluka. The outturn is in every case poor and in one case miserable. The rains failed to a very serious extent, and the wheat crop especially suffered; other rabi crops would, of course, also suffer. I regard these experiments as decidedly useful. Mr. DuBouly says: "The first two crops were selected rather for my private edification than for the purpose of supplying statistical information. They were chosen as representing to my untutored eye the kind of crop which the villages along the Tápti have harvested in this year of drought. The first represents the general average crop in the affected area, the second represents the worse crops which covered a considerable area there. I mentally catalogued them as a 4-anna and a 2-anna crop; the results show that my mental estimates are unreliable. As regards the third crop, I selected it as showing a fair average specimen for the whole Sháháda táluka this year." These experiments are, as I have observed, very useful, provided that the peculiar conditions are clearly stated.

The first field is said to have had 17 cart-loads of cow-dung per acre before sowing. The others were unmanured. It is doubtful whether the manure applied had any beneficial effect on account of the drought. The soil in all the three fields is black, but not quite pure black soil in the third field. The land sloped slightly and the people called it *berad káli* or *ráichikan*. The season was very bad. The variety of wheat is *gore gahu* or white wheat.

Details of outturn, &c. :—

| | Anna Estimate. | Outturn of Gram per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | As. | Lbs. | Rs. a. p. | Rs. a. | |
| Experiment No. 36 ... ... | 4 to 5 | 329 | 7 13 11 | 2 13 1 | 35·80 |
| „ No. 37 ... .. | 4 | 68 | 1 7 9 | 2 12 8 | 188·07 |
| „ No. 38 ... ... | 11 | 342 | 10 3 0 | 2 5 7 | 23·05 |

The experimenter gives the anna estimate according to the owner's statement, but he himself thinks the correct estimates are 4, 2 and 8 annas. The seed-rates vary from 76 to 95 lbs. per acre and are above average. The seed sown exceeded the outturn in the second test.

Wheat is sold in Khándesh by the *máp* of 384 *sers*. The price rapidly rose after harvest owing to the poor crops. It varied from Rs 12 to 20 per *máp* during the season. In the first test Mr. DuBoulay values the grain at Rs. 15 per *máp* or 47½ lbs. per rupee, in the second at Rs. 12 per *máp* or 57⅘ lbs. per rupee, and in the third at Rs. 18 per *máp* or 38⅘ lbs. per rupee. The grain in first and second tests is valued at a cheap rate for an average year and is not dear as valued in the third test. Wheat brought by Banjáras and others from Western Khándesh was selling last March at Navsari at from 23 to 25 lbs. per rupee.

*Mr. G. W. Hatch, Assistant Collector,*

Sends four tests exactly according to the prescribed programme. His first experiment (No. 39) was on *bájri* near Bhusával on the light and poor land broken by *nálas* which throughout the district borders on the Tápti river banks. No manure was applied and the cultivation is termed indifferent. The crop was a poor one and Mr. Hatch adds that the *bájri* throughout the eastern part of the district has been very poor and in some places it has entirely failed owing to the drought of August and early September. The land grows *jowári*, cotton and *bajri*. The outturn of grain was 259 lbs., which is priced at 24 local *sers* or 43 lbs. per rupee. By-products at 480 lbs. per rupee. The assessment is Rs. 1-12-1 per acre and the incidence works out to 18·80 per cent.

The second experiment on *bajri* taken at Jalgaon Kasba is not of much value, as it does not represent anything like the ordinary *bájri* crop. The experimenter explains that he left this experiment so late that there was no other field, and this field suffered even more from want of rain than the first field. The seed was sown in the middle of August and Mr. Hatch says that probably there was no rain for three or four weeks after sowing and a good deal of the seed never germinated. The experimenter reports that the field was exceptionally bad for an experiment. The value of the yield was only Rs. 5-13-9 per acre and the incidence of assessment 36·53 per cent. I do not report the results in the tabulated statement.

The experiment (No. 40) on sesamum (white *til*) forms a contrast to the *bájri* tests. The field, a black soil one, grows cotton, *til*, linseed and *jowári*. It was dressed with farmyard manure at the rate of 7½ cart-loads per acre before sowing. Mr. Hatch does not believe this statement. *Til* on deep black soil can withstand drought better probably than any other crop, and the absence of rain in August-September probably did the crop no harm. The outturn of seed came to 460 lbs. per acre and the incidence of assessment to 4·54 per cent. The price of the grain, at 12 *sers* of 59 *tolas* each per rupee, comes to 18⅐ lbs. the rupee.

This officer's fourth test (No. 41) was on unirrigated wheat, *Bansi*, grown on a black soil field at Varangaon in the Bhusával táluka. The field is said to be manured every third year and the present is the third crop since manuring. Seed-rate 80 lbs. per acre is high according to the formulæ and Mr. Hatch states that it is hard to find out the truth. The formula of 32 lbs. is generally exceeded in Khándesh. The wheat crop both in the field and throughout this part of the district is considered only a 4-anna one. Outturn is given as 236 lbs. per acre grain and 240 lbs. *bhusa*. Mr. Hatch values the grain at 2 annas a *ser*, apparently a retail price, or 29⅛ lbs. per rupee. The by-product, *bhusa*, is valued roughly at 160 lbs. per rupee. The incidence of assessment comes to 34·81 per cent. on Rs. 3-5-6 per acre of assessment.

*Mr. Shitárám Dámodar, District Deputy Collector,*

Submits three experiments, two on *bájri* and one on sesamum. Two of the fields were selected in the Dhulia táluka, the third in Amalner táluka. The season for each crop is described as favourable. The *bájri* tests may be contrasted.

The first field has *barad* soil manured every third year with homestead manure. The crop got 10 loads per acre. The field grows *jowári*, *bájri* and cotton, the cereals with the usual subordinate mixtures. The *bájri* experimented upon was apparently grown alone. The assessment, original survey, is Re. 0-10-2 per acre. The second *bájri* field has reddish soil and bears a revision assessment of Re. 0-9-5 per acre. Manure is never applied. The field grows *bájri* and cotton and gets sufficient tillage, as it is free from *kunda* and *kariáli*. These grasses if once established are troublesome weeds. In the first field 11½ lbs. seed per acre was sown, in the second 9¼. These are about average rates. Each crop was seasonably sown in June and reaped early in October.

The outturn, &c., results are as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| 1st field (manured) ... | 14 | 459 | 853 | 11 4 10 | 0 10 2 | 5·62 |
| 2nd field (never manured). | 12 | 325 | 1,892 | 13 1 2 | 0 9 5 | 4·50 |

The sesamum crop tested by this officer yielded exceptionally well. The field has middle class black soil and bears an assessment, original survey, of Re. 0-10-8 per acre. The crop is said to have been manured with 20 loads ordinary manure per acre. The seed was sown in June, the crop ripened in October and yielded 554 lbs. seed per acre worth Rs. 34-2-11. The percentage incidence of assessment is only 1·95.

I do not enter any of this officer's tests in the tabulated statement because there is considerable doubt as to the accuracy of the reported figures. The tests were taken in October 1895, and the reports submitted full nine months afterwards. There are large discrepancies between the weights of local *sers* as reported by the experimenter and as found in my office. The respective weights are :—

| Experiment. | Weights reported by the Experimenter. | Weights found in Director's Office. |
|---|---|---|
| | Tolas | Tolas. |
| 1 (Bájri) ... ... ... | 150½ | 163¼ |
| 2 (Sesamum) ... ... | 115 | 158 |
| 3 (Bájri) ... ... ... | 144 | 155¾ |

*Mr. F. B. Young, Superintendent of L. R. and Agriculture, C.D.,*

Sends two *jowári* tests (Nos. 42 and 43). Each field grew a pulse subordinate to the *jowári*, *udid* in the first field and *mug* in the second. The pulses were harvested before the test areas were selected, therefore their outturn is unknown and the experiments for this reason are somewhat unsatisfactory. Both fields are service Ináms. There are six shareholders in the first field and four in the second field by right of inheritance. Mr Young remarks that the first field is never manured owing to ill-feeling between the sharers and has not been ploughed for 6 or 7 years. The heavy harrow (*vákar*) was used three times before sowing. The crop was bullock-hoed with the *kolpa* four times at intervals of a fortnight, the first hoeing being given 3 weeks after sowing. The rows were also

hand-weeded by women and the field was free of weeds. About 7 lbs. of seed per acre sown in July produced a crop which ripened late in November. The field grew cotton, *jowári*, wheat, linseed and *bájri*, rotated with each other in rather an irregular manner. The season was fair. The second field did not give a better crop notwithstanding an application of 8 or 9 loads of manure applied per acre in May. The rotation is the same in both fields. The soil is black, but faulty in parts. On these portions the crop was poor and a few of the heads of grain diseased. Half the field grew linseed this year, ¼ was under the tested crop and ¼ waste or under grass. The *jowári* portion was ploughed in the fair season and subsequently repeatedly harrowed. It was bullock-hoed and weeded much in the same manner as the first field. The grain got from the first field was superior to that of the second, being heavier per measured *ser*; both are valued at the same rate, therefore the inferior sample is dearer weight for weight.

The outturn, &c., results of both fields are :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | | |
| Experiment No. 42 | 18 | 566 | 4,975 | 20 13 0 | 2 7 1 | 11·73 | Unmanured field. |
| Do. No. 43 | 19 | 591 | 3,675 | 20 10 0 | 2 5 6 | 11·36 | Manured field. |

The anna estimates are, I think, too high.

## Na'sik.

Mr. Stewart was asked to take one experiment each on *bájri*, *jowári* and cotton. He could not do the last. The reasons put forth by Mr. Kábráji for his failure to do any experiments have been regarded by the Collector as unsatisfactory. Mr. Thatte carried out the programme, but his *rági* and *bajri* experiments have been rejected for reasons given below.

*Mr. R. B. Stewart, Assistant Collector,*

Submits two tests, one on *bájri* and another on *jowári*. The former gives exceptionally good results.

The *bájri* field (Exp. No. 44) has black soil and is irrigable from a *bandhára*. It bears a consolidated assessment for soil and water of Rs. 8-8-0 per acre. The field grows second crops of gram and *methi* after a rain crop of *bájri*. The second crop in ordinary years gets apparently a full advantage of water; this year the early rain was scant and the *bájri* was regularly irrigated. The *bájri* was only lightly manured, 3 loads of cattle-dung per acre having been applied in June. The seed was sown on the 10th July. The crop ripened late in October. The grain is valued at the cheap rate of 62½ lbs. per rupee. The crop yielded per acre 1,578 lbs. of grain and 5,610 lbs. useful by-product together worth Rs. 28-9-6. The incidence is 29·79 per cent.; this is moderate in as much as the whole of the water-rate is included in the assessment, and the water in ordinary years will presumably be most useful for the second crops only.

In answer to a reference, Mr. Stewart says that the *bájri* crop was exceptionally fine. The anna valuation should, I think, be 20. Mr. Stewart also says that the Mámlatdár of Málegaon reports the *bájri* rate at the end of October Rs. 4-11-10 per maund and adds: "This is the Bazár rate for buying, not the rate a Kunbi gets when selling, but it may be accepted, as probably the man would not sell the *bájri* as he had little." At this rate, about 48½ lbs. per rupee, the value of the crop comes to Rs. 33-4-4 and incidence of assessment to 25·54 per cent.

*Shálu jowári* (Exp. No. 45) tested by this officer gave poor results due to the failure of the late rains. The crop was locally estimated as a 6-anna one. It was more deficient in grain than in straw. The field has black soil and grows linseed and *jowári* in alternate years. The assessment is Re. 1-1-5 per acre. The seed was drilled in October, the seed-rate 2½ lbs. per acre being much under average. The crop was ready in about 3 months and only yielded 118 lbs. grain and 1,200 lbs. useful by-products per acre worth Rs. 5-12-6. The incidence works out to 18·82 per cent. Although the figure is high it does not prove that the burden of assessment is heavy in an average year.

*Mr. C. M. Thatte, District Deputy Collector,*

Reports one test each on *nágli* and *bájri* and two on groundnut.

The *nágli* experiment was made on red stony *mál* land assessed at annas 5 per acre. The field during the last four years grew two crops of *nágli*, one of *khurásni* (niger seed) and was one year waste or fallow. The seed-bed was rábed liberally with cow-dung, branch wood and dried grass. The outturn figures, *viz.*, 1,065 lbs. grain and 944 lbs. straw, &c., per acre, represent a fair good crop for this class of land, but I cannot report this test. Mr. Thatte was engaged at harvest time with special audit of accounts and entrusted the Mámlatdár to select test areas in two fields and also to cut and stack the crops. Subsequently Mr. Thatte saw the produce of the test areas threshed, winnowed and weighed. The results of one of the tests are not reported for reasons not given.

Mr. Thatte's *bájri* test is also rejected. He selected a field from which the crop had already been harvested and stacked. On hearsay evidence he assumed that a particular stack contained the exact produce of a particular area. This may or may not have actually been the case. It would have been difficult to determine the exact area on which the *bájri* grew. The crop only occupied a small portion of a large number. Mr. Thatte says: "I employed 80 men to cut off the ears of the stacked bundles. They took nearly half an hour to do this." It is certain that so many men could not have been got for the work except under compulsion. They were either inadequately paid for their trouble or the experiment cost Government much more than it ought to have done. In any case the employment of so many men for such simple work must have appeared farcical to the owner of the field and other ryots and was calculated to increase that hostile feeling against crop experiments which is already more or less general.

Mr. Thatte's groundnut tests (Nos. 46 and 47) are not in all respects satisfactory. The first crop was harvested before it was quite ripe. The nuts were allowed to dry for only three days before being weighed. The second field was harvested dead ripe on the 11th of January, exactly a month after the first field. The nuts were allowed to dry four days before weighment. The principal product in each case is valued at the same rate in lbs. per rupee. The nuts of the first field when shelled gave 66·6 per cent. kernels. Those of the second field 69·4. The haulms (leaves and stems) of the first crop would probably be more or less green at harvest time, and would certainly be more valuable as fodder than the same by-product in the second field. The by-product in each case is valued at Rs. 8 per acre. Mr. Thatte again collected a large number of men to harvest his test areas, 80 men being employed one hour in the first field and 40 men 2½ hours in the second field. A large number of labourers must necessarily be employed for a groundnut test, because the work is tediously slow. Yet I think less than 80 might very well have sufficed.

Each field has black Bágáyat soil. The first field is irrigable by well and *pát* water, the second by *pát* water only. The first field grew onions, groundnut and *bájri* during the last three years. In the second, onions, groundnut and wheat were grown in the same period. The *pát* water of the second field apparently lasts during the cold weather, otherwise wheat and onions could not be grown. Each of the tested crops were broad-casted; this probably means that the seed was sown by hand behind the plough. This is a common method of sowing the crop. The seed-rate of the second field, 60 lbs. per acre, is high.

The fields were liberally manured with ordinary manure in May.

Outturn, &c., results are as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 46 ... | 8 | 1,456 | 2,761 | 43 1 0 | 2 13 0 | 6·53 |
| " No. 47 ... | 8 | 1,543 | 2,976 | 45 2 2 | 3 8 6 | 7·82 |

## Ahmadnagar.

Experiments on *jowári* were ordered from this district, Mr. Sorábji conducted only two tests. Mr. Simcox's omission to experiment has not been explained. Other officers have followed the programme.

Mr. F. B. Young, Superintendent of Land Records and Agriculture, C. D., did one test on *jowari* and one on wheat in this district.

*Mr. Sorábji Padamji, Assistant Collector,*

Sends two tests (No. 48 and 49) on *shálu jowári*. Each crop had subordinate rows of safflower (*kardai*). The oil-seed came to nothing in the first field and barely yielded the seed sown in the second. The subordinate crop was, however, not actually tested. The season was unfavourable. No rain fell after sowing. The first test was taken on *barad* or *mál* land, the second on a black soil field. The *mál* land is said to have suffered least from want of rain. This I do not understand. No manure was given to either field. If due count is taken of the character of the season, the results tabulated below must be considered quite satisfactory :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | | |
| Experiment No. 48 ... | 8 | 471 | 1,260 | 11 9 0 | 0 8 9 | 4·73 | Barad soil field. |
| " No. 49 ... | 8 | 392 | 1,297 | 9 13 6 | 0 14 10 | 9 42 | Black soil field. |

The superior holder of the first field has sublet it to a tenant. The owner pays the assessment, gives the tenant $\frac{2}{5}$th of the seed required, and takes $\frac{3}{5}$th of the produce.

*Mr. R. C. Brown, Assistant Collector,*

Sends three experiments on *jowári*. They were all taken on the same day, at the same village and in fields quite close together, and the conditions of season, cultivation and soil are the same. The soil was brownish with stones. The cultivation is good because the land was well ploughed. No manure was applied to any of the fields. Rainfall was insufficient. Each *jowári* crop has safflower subordinate to it, and the safflower was also tested. Mr. Brown says he does not think the fields would ever produce much better crops. That means that the crops are 16-anna ones, but Mr. Brown gives the anna valuations as 8 for the first and 10 for the other two. The crops are said to have been fairly typical of the crops round Párner. The fields grow *bájri* and *jowári* alternately. Mr. Brown gives very meagre notes. Seed-rates given are 6 lbs. 6 *tolas* for the first field, 4 lbs. 4 *tolas* for the 2nd, and 36 lbs. 36 *tolas* for the third.

I cannot accept the last as accurate. It is six times the average, and there is no indication of any necessity for so much seed. Seed was drilled with a *pábhar*.

Outturn figures are :—

| | Outturn per Acre. | | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | Principal Product. | | By-Product. | | | |
| | Jowári. | Safflower. | | | | |
| | Lbs. | Lbs. | Bundles. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 50 ... | 338 | 3⅛ | 325 | 10 0 4 | 0 6 0 | 3·76 |
| ,, No. 51 ... | 470 | 1½ | 390 | 12 13 5 | 0 8 7 | 4·17 |
| ,, No. 52 ... | 404 | 14¾ | 350 | 11 12 4 | 0 4 6 | 2·43 |

Mr. Brown has made his calculations at rates of one *ser* equal to 109⅝, 114½, 112½ *tolas* in the three tests. The weights found in this office were 106¾, 108, 105 *tolas*. These are serious discrepancies and throw some doubt on the results arrived at.

*Mr. L. M. Deshpande, District Deputy Collector,*

Submits two late *jowári* tests.

The first field (Exp. No. 53) was black *gavháli* or wheat-growing land. The early rains were good and abundant, but the later rains failed and the crop was affected. Outturn, however, is very good. Local anna estimate is 12. No manure was applied. The seed was drilled with a *tiphan* late in September. Safflower was subordinate, but it appears to have failed almost entirely.

The second field (Exp. No. 54) was of *keota* soil, apparently alluvial deposit, growing wheat, *bájri*, &c. The season was as above, and the cultivation was good. No manure was applied. The subordinate safflower here, too, came to nothing. Anna estimate is 8, which is possibly rather low.

Mr. Deshpánde began another test (No. 55) on *jowári* when he was relieved by Mr. Vádekar, who finished and sent in the experiment. The soil is brown *mál* soil, and the field grows *jowári* and *bájri* with subordinate crops of safflower, &c. Manure has never been applied to the field within the memory of man. The season was not very good, as the rainfall was scanty. Cultivation was good. Five pounds seed were sown per acre late in September with a *tiphan*. Safflower appears to have come to nothing. The *jowári* outturn is not very good, but I fancy it is more than the 8-anna crop which it is said to be. There is a tendency for experimenters to consider a 16-anna crop as a bumper one, even when they know that it should be regarded as an average one. Mr. Deshpánde, for instance, says "the season for *jowári* was a good one," and further on, "the average crop of *jowári* for the táluka was set down as a 12-anna crop."

Outturn, &c., per acre of these three fields are :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | | Lbs. | | Rs. a. p. | Rs. a. p. | |
| Experiment No. 53 ... ... | 12 | 1,193 | 3,250 kadbi ... 220 chaff ... ... | 22 6 3 | 0 14 3 | 3·97 |
| ,, No. 54 ... .. | 10 | 759 | 5,350 kadbi ... 262 chaff ... ... | 19 11 1 | 0 14 4 | 4·55 |
| ,, No. 55 ... ... | 8 | 409 | 1,754 kadbi .. 200 chaff ... ... | 14 4 5 | 0 13 0 | 5·69 |

*Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.,*

Submits two experiments, one on *jowári* and the other on wheat, safflower and mustard.

The *jowári* (Exp. No. 56) was taken at Shevgáon. It is an irrigated crop and the outturn is enormous. Mr. Young says: "The cultivator considers the

crop a bumper one. Very few heads of grain were damaged by *kani*, a disease which few, if any, *jowári* crops escape, speaking from my own experience." The yield of grain was 3,595 lbs. per acre. No such yield has ever been reported before. I have never seen or heard of a crop even half so good. Mr. Young only cut 4 gunthas considering this a garden crop. It would have been better had he cut 8. He says the crop was fairly even. The field is friable blackish garden soil locally known as *sanvat*. The season was favourable and the cultivation good. The field was ploughed in the latter part of September with an eight-bullock plough, twice. It was then harrowed with a four-bullock harrow (*mogad*) and levelled with an *aut* or *kulav* drawn by two bullocks. A month afterwards it was again levelled and the seed was sown. The field is near the village. About 200 cart-loads of manure consisting of a compost of cattle droppings, ashes and refuse were put on in May, presumably to the whole field of 5½ acres. Half the manure came from the cultivator's own animals and half some obliging friends gave him. It is unusual to meet with friends so obliging as this. The price of manure is said to be 4 annas per cart-load. Seed-rate is 20½ lbs. per acre, which though a high rate may be accepted as correct. The seed was sown in November with a two-coulter drill, both lengthways and breadthways. The crop was irrigated from an old well built prior to the original survey. No water-rate is levied. Mr. Young makes the following remark :—" The registered occupant has mortgaged the number for Rs. 300 for 15 years, during which period no interest is to be paid, but the produce is to be enjoyed by the mortgagee, who has sublet the number to the present cultivator for 3 years for Rs. 75 per annum, assessment to be paid by mortgagee, and all cost of cultivation by cultivator, who owns 12 bullocks, 2 ploughs and all the necessary agricultural implements ; he also has a family of five sons and employs labourers only for weeding and harvesting. He also owns and cultivates two other numbers and cultivates another for his brother, who appears to be both lazy and lacking in funds." About half the area experimented on was this year sown first with *maka*, *mug* and *rála*.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 56. | 20 | 3,595 | 5,600 kadbi. 400 chaff. | 86 3 0 | 1 4 5 | 1·48 |

Mr. Young's other test is valuable because it includes the subordinate crops of safflower and mustard. The field is black soil and it grows *bájri*, *jowári*, wheat (unirrigated), safflower, mustard, *tur*, gram, *hulga*, *udid* and linseed. The rotation is undefined, but generally *udid* with gram as a second crop is grown the season before wheat. Mr. Young remarks that the best portion of the crop, it was a little uneven and the experimenter cut four patches, was grown where gram was sown last season. Such black soil as is favourable for wheat is locally called *gavháli* (wheat-growing). As to the cultivation, Mr. Young describes it as good and says : " The portion sown with *bájri* in 1894-95 was ploughed (6 bullocks) in December 1894 and January 1895 ; the whole field was ploughed (4 bullocks) last September, a fortnight afterwards it was harrowed with a *kulav* (4 bullocks) and again a week afterwards with a *kulav* (2 bullocks); the field was then weeded and the soil loosened with a *pharát* (2 bullocks) before sowing which took place in October, the *pharát* following the drill at the time of sowing. The field was free from weeds."

The area under gram, about ¼th of the whole, was manured before sowing in 1894-95 (7 cart-loads) and half the field was manured this season with 15 cart-loads. Half the manure was homestead manure and half purchased at 8 annas a cart.

Of the owner Mr. Young says: "The registered occupant owns and cultivates ¾ of this number, the remaining ¼ is owned and cultivated by his nephew. The former is the registered occupant of 42 acres assessed at Rs. 73; the produce of his fields, after supplying the requirements of his family consisting of himself, wife, 4 sons, their wives and children, leaves a surplus which is taken to Ghoti, a large market village with a railway station in the Igatpuri táluka. The field under experiment came into the present occupant's possession by virtue of a mortgage for Rs. 900 and the addition of Rs. 500 paid later on to the widow of the original owner. The mortgagee cultivated and enjoyed the produce of the field as interest on Rs. 900."

Outturn, &c., per acre:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 57 ... | 16 | 504 wheat ...<br>21½ safflower.<br>4 mustard. | 800 | 20 8 2 | 1 9 9 | 7·84 |

## Poona.

Experiments on rice, *bájri*, *rági* and gram were selected for this district, and the programme was carried out in its entirety.

*Mr. H. W. J. Bagnell, Assistant Collector,*

Reports three experiments, one on rice, one on *rági* and one on mixed *bájri* and *jowári*. They are none of them quite satisfactory.

In the rice experiment (No. 58) the sample received gave 73 *tolas* to the *ser*. Mr. Bagnell states that 79 *tolas* go to the *ser* and can only account for the difference by dryage. This is unsatisfactory because it is not clear whether the experimenter's figures should be altered or not. It is better to leave them as they are. The field measures 1 acre 14 gunthas and is assessed at Rs. 5 or Rs. 3-11-3 per acre. The soil is known as *pándhri burki*; this is a comparatively light description of soil suitable for inferior sorts of rice in years of favourable rainfall. The field only gets manure once in four years and the outturn results are therefore as good as the cultivator could have expected. The season was on the whole favourable. The crop was grown from seedlings transplanted from a seed-bed rábed with cow-dung and grass. The quantity of ráb materials is not given, nor is the proportionate area of seed-bed to acre of transplantation. It is not clear therefore how the experimenter determined the per acre seed-rate which is stated to have been 90 lbs per acre. The outturn, 1,266 lbs. grain and 3,360 lbs. straw per acre, is valued at Rs. 24-13-1. Incidence works out to 14·92 per cent. The straw is valued at the cheap rate of 12 cwts. per rupee.

The experiment on *nágli* (No. 59) was done on the same day at the same village and, judging from the fact that one field is Survey No. 279 and the other Survey No. 284, almost in exactly the same place. The field of this experiment has grown *nágli* four times in the last 5 years and *til* once. The crop is estimated at 16 annas. Bhikáris are said to camp on the land with their animals during the three hot weather months, but beyond that no manure is applied. Perhaps that is enough. Nine pounds seed per acre were sown in a rábed bed; amount of ráb materials and area of bed not given. Outturn is 908 lbs. grain and 1,370 lbs. straw per acre, worth Rs. 19-8-9. Assessment is Re. 0-14-5 per acre and incidence 4·61 per cent.

Mr. Bagnell's third experiment (No. 60) is on *bájri* sown with *jowári*, not a common mixture. Twelve *sers* of *bájri* and one of *jowári* (28 lbs. mixed seed)



8272

are said to have been sown per acre. The seed-rate is extremely high. The soil is deep mixed black. Mr. Bagnell could not find any *bájri* unmixed with any other crop, though he went " from one end of the village to the other." The field is said to grow *bájri* and gram every year. Presumably this means that the land ordinarily is double cropped every year. The soil is therefore probably of rather high class quality. The experimenter says 200 cart-loads of manure were applied to 7½ acres of land at Re. 1 per cart-load, adding that it is impossible to gauge the truth of this statement, but it seems a great exaggeration, seeing that manure at this rate would cost Rs. 26 per acre and the gross outturn is only Rs. 24; it seems safe to assume that the statement is clearly wrong and that a much lighter dressing was probably given. The grain outturn was 672 lbs. *bájri* and 121 lbs. *jowári* per acre valued at Rs. 20-5-0. The straw is valued at Rs. 3-12-0 and weighs 3,040 lbs. The two kinds ought to have been separately shown, as *jowári kadbi* is much more valuable than *bajri* straw. The incidence works out to 6·08 per cent.

*Mr. G. Carmichael, Assistant Collector,*

Sends three experiments—one on *bájri*, one on *nágli* and one on gram. The samples of grain received here showed differences from the recorded weights thus:—

| Crop. | Weight recorded by Experimenter. | Weight found in Director's Office. |
|---|---|---|
| | Tolas. | Tolas. |
| Bájri ... ... ... | 95 | 91½ |
| Nágli ... ... ... | 89 | 84 |
| Gram ... ... ... | 99 | 97¾ |

Mr. Carmichael suggests that the differences may be due to dryage, submits that he took some trouble to get the grain dry, and says that it was carefully weighed in his presence. Mr. Carmichael's recorded weights must be accepted, but it is much to be desired that these mysterious differences should not constantly occur. Mr. Carmichael's weights showed the same considerable differences last year. The experimenter's notes are very meagre.

For *bájri* (Exp. No. 61) the season was unfavourable. The soil is medium quality friable black soil assessed at Re. 1-4-6 per acre, growing *bájri*, groundnut, *jowári* and wheat. In good years a second crop is got after *bajri*. One ploughing and four harrowings were given to the land, but it was not very clean. No manure was applied.

Outturn, &c., per acre is:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 61 ... | 6 | 323 | 1,380 | 10 2 6 | 1 4 6 | 12·61 |

The second experiment (No. 62) was on *nágli*. The main field was manured at the rate of 3 cart-loads of sweepings and cow-dung per acre and the seed-bed rábed with 5 cart-loads of cow-dung covered with grass and rubbish. The season was unfavourable, and the crop was saved by the late rain. The soil is stony black soil (*mál jamin*) one foot above the rock. Seed-rate is given as 3 lbs. per acre, which is rather low.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 62 ... | 9 | 856 | 975 | 13 11 3 | 0 6 3 | 2·85 |

Gram is priced at 28 *sers* of 89 *tolas* each or 64 lbs. per rupee.

The third experiment (No. 63) was on gram, a second crop after *bajri*. The season was favourable, the cultivation good and the crop an average one for the village. The anna estimate is 10 as given by Mr. Carmichael. The soil is medium black inclined to be reddish. It grows *bájri*, groundnut, *jowári*, &c., and for the last three years has not grown, as this year it has, a second crop. The gram was drilled in immediately after the *bájri* was removed at the rate of 30 lbs. per acre. No manure was applied this year, but 15 cart-loads of sweepings and cow-dung were put on last year. The gram was twice irrigated from a *pát*. Of the whole field 1 acre 33 gunthas is assessed as Bágáyat at Rs. 2-8 plus Rs. 6 water-rate, or in all Rs. 4-6-2 per acre. Outturn comes to 635 lbs. pulse and 350 lbs. chaff per acre, valued at Rs. 18-2-8. Incidence, which, it must be remembered, is on the second crop only, works out to 24·14 per cent.

## Shola'pur.

Each Assistant was asked to conduct experiments on *bajri*, linseed and sesamum. Mr. Kennedy could not do the *bájri* and sesamum tests owing to his detention at Bársi by outbreak of cholera, and selected gram and *tur* instead. Mr. Scott similarly chose gram for *bájri* for reasons not given.

*Mr. B. C. H. Kennedy, Assistant Collector,*

Submits 3 experiments, one each on linseed, gram and *tur*. The experimenter has made no use of the remark column. The samples of grain forwarded to my office gave an excess of 3, 6½ and 4½ *tolas* over the figures recorded in the three tests.

The linseed and gram tests (Nos. 64 and 65) were taken in the same village on the same day. The fields have each brown black soil. The linseed field bears an assessment of Re. 0-11-4 per acre and grows chiefly *jowari*. It belongs to a non-resident Sávkár, who cultivates it by hired labour. The gram field also belongs to a non-resident Sávkár, who has leased it for three years to a Marátha cultivator. The experimenter ought to have reported the terms of the lease. No manure was applied to either field. The season was fair. The cultivation is described as ordinary.

The outturn, &c., results are as under :—

| | Anna Estimate. | Outturn per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. | Remarks. |
|---|---|---|---|---|---|---|
| | | Seed or Grain. | | | | |
| | As. | Lbs. | Rs. a. p. | Rs. a. p. | | |
| Experiment No. 64 ... | 10 | 348 | 16 13 3 | 0 11 4 | 5·57 | Linseed. |
| „ No. 65 ... | 8 | 387 | 9 2 11 | 0 13 7 | 9·24 | Gram. |

No count is taken of the by-product, which in the case of gram would be of considerable value.

The *tur* (Exp. No. 66) tested by this officer is said to have been sown in October and reaped in February. I fancy the crop was sown earlier. It is not a common practice to sow *tur* alone. The field has brown black soil assessed at Re. 0-9-10 per acre. The crop yielded well, but is only estimated as an 8-anna one. The outturn was 760 lbs. pulse per acre worth Rs. 15-15-0. Again the value of the by-product is neglected. The incidence of assessment is only 3·85 per cent.

*Mr. G. Scott, District Deputy Collector,*

Forwards an experiment on sesamum and a test on gram and another on linseed, all of which are reported with very few remarks.

The sesamum field (Exp. No. 67) is a large one of 25 acres 31 gunthas assessed at Rs. 6 or Re. 0-3-8 per acre. It is brown *mál* land. The rotation is undefined; crops such as *jowári*, *bájri*, gram, linseed, *tur*, &c., are grown. No manure was applied and the cultivation is described as indifferent. The crop is stated to be a 12-anna one when 16 annas is the maximum, or 16 annas according to the usual standard. 2¾ lbs. seed were drilled in August and the crop was reaped in November. The outturn is 121 lbs. oil-seed per acre valued, at 18⅙ lbs. per rupee, at Rs. 6-10-8. Mr. Scott values the by-products at 10 annas per acre. In the report I have omitted this, as the by-products do not appear to be useful for anything but burning. Incidence works out to 3·44 per cent.

The sample *ser* of gram (Exp. No. 68) received weighed three *tolas* less than the recorded weight. The crop is said to be a 14-anna crop. The outturn is 429 lbs. pulse valued at Rs. 11-13-0, making the incidence 3·83 per cent. on an assessment of Re. 0-7-3 per acre. The whole field measures 26 acres 22 gunthas, of which 5 gunthas are *kharáb* and grows *bájri*, *tur*, *jowári*, &c. Eight cart-loads of farmyard manure per acre are said to have been put on the land before sowing, and about 26 lbs. of the pulse per acre were sown with a three-coulter drill in October. By-products are valued at 5 annas for the acre, but amount not stated, and the pulse at 37⅓ lbs. per rupee.

The linseed field (Exp. No. 69) has black soil. The number is large; it extends to 29 acres 3 gunthas and bears an assessment of Re. 0-11-6 per acre. The linseed was mixed with safflower; the latter was not tested. The experimenter says this is the first time linseed has been sown in this field. The season is called average and the cultivation indifferent. No manure was applied. The seed-rate is just under 21 lbs. per acre. This is high. The seed was drilled with a three-coulter drill in October. Mr. Scott says the safflower occupied one out of 8 gunthas, and he calculates his acre averages on the assumption that the linseed occupied 7 gunthas. As usual I prefer to bear in mind the fact that every eighth row was safflower and calculate the averages on the 8 gunthas.

Outturn, &c., per acre was ;—

| | Anna Estimate. | Outturn of Seed per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | As. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 69 ... ... | 11 | 219 | 11 10 11 | 0 11 6 | 6·16 |

## Sa'ta'ra.

Eight experiments have been reported from this district. A test on rice, another on *rági*, and a third on wheat were to have been made by Mr. Rand, but he was away at Poona when the rice and *rági* were harvested, being engaged in examining at the Departmental Examination. So he submits all the three tests on wheat. Mr. Arthur carried out two experiments, one on gram and another on wheat. He could not manage to do more owing to heavy work. Mr. Shepherd did not experiment owing to his detention at head-quarters and later on his attachment to a survey party. Mr. Cursetji followed the programme prescribed.

*Mr. W. C. Rand, Assistant Collector,*

Submits three experiments on wheat, in each case a second crop. The experiments submitted are carefully worked out and reported.

First experiment (No. 70) was on spelt wheat or *Khapli*. The field is divided into three parts, Bágáyat, Jiráyat and Rice. The cultivator treats the Rice and Bágáyat portions as one. They together measure 1 acre, are assessed at Rs. 2 plus Rs. 2-8 for the water of a *pát*, which conveys water from a stream in an adjoining village; total assessment Rs. 4-8-0 per acre. The field has reddish soil. The cultivation is described as fairly good and the season moderately favourable. The rotation is undefined. Seed was sown in October.

The wheat was a second crop after *sáva*. The whole survey number was sown with *sáva* and after its removal 32 gunthas were sown with wheat, about 5 gunthas with barley and half a guntha with sweet potatoes and brinjals. The wheat was watered four times. No manure was put on the field this year. It is manured every three or four years, whenever in fact manure is available. The yield given is of grain husked.

The other two experiments (Nos. 71 and 72) were on *Pota* wheat, both irrigated from a *pát* and both second crops after rice. Season and cultivation good. Seed-rates in both cases very high, 136 and 156 lbs. per acre respectively. The area under wheat was 9 gunthas in the first and 6½ in the second, and when small areas are sown the amount of seed put on is always far above the average. The first field only received one watering as it is situated in such a position that the soil remains damp for a long time. There is a water-rate of Rs. 3 levied, but not on the portion of the field under experiment. About half of the area experimented on had been used as a seed-bed for rice, and 20 head-loads of loppings, 4 crates of *sáva* straw and 25 baskets of house refuse had been burnt on it. No further manuring was done to the wheat. Mr. Rand does not say whether the second field was watered for the wheat or not. He merely says that it is well situated for holding water. It was probably watered once or twice. There is no water-rate. Before the rice 10 baskets of cow-dung were spread over 6½ gunthas, and the land experimented on formed part of that area.

Outturns are contrasted below :—

| | Anna Estimate. | Outturn of Grain per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. | Remarks. |
|---|---|---|---|---|---|---|
| | As. | | Rs. a. p. | Rs. a. p. | | |
| Experiment No. 70. | 16 | 485 | 19 5 6 | 4 8 0 | 23·26 | Khapli wheat. |
| Do. No. 71. | 16 | 659 | 20 7 7 | 2 12 1 | 13·45 | Pota wheat. |
| Do. No. 72. | 18 | 934 | 28 1 6 | 5 9 11 | 20·00 | Do. |

Considering that these are all second crops the assessment seems moderate. It is a pity that the double crops could not be tested.

*Mr. S. R. Arthur, Assistant Collector,*

Reports an experiment on gram and another on wheat. Neither are quite satisfactory, in as much as the weights of sample *sers* as found in my office differ from those reported by the experimenter; and again the weights reported differ from those on which the calculations of acre averages have been based. The differences are shown below :—

| Crop. | Weight of sample reported by the Experimenter. | Weight of sample on which calculations are based. | Weight of sample found in Director's Office. |
|---|---|---|---|
| | Tolas. | Tolas. | Tolas. |
| Gram ... ... | 119 | 105 | 123 |
| Wheat ... ... | 123 | 110 | 127 |

The gram experiment was taken on a field which usually grows *jowári* and *bájri*; the former sometimes grown alone, sometimes with subordinate rows of *tur*. The kharif season was this year unfavourable and the *jowári* and *bájri* outturn was poor. The late rains were abundant and this induced the occupant to sow gram as a second crop. The field has red soil assessed at Rs. 2-4-0 per acre. It is ploughed every year and, before the kharif crop was sown, was this year manured with 5 loads cow-dung per acre. The season was favourable and cultivation good. The seed-rate, 86 lbs. per acre, is overestimated. Half the quantity would be ample. The seed was drilled in November. The crop ripened in February and yielded 410 lbs. pulse worth, with the by-product, Rs. 12-3-2 per acre.

The wheat experimented upon was a second crop after rice. The field was manured for the rice, but not directly for the wheat. The preparatory tillage for the rice is fully described; that for the wheat is not, but it is described as good. Presumably the land was ploughed after the rice was reaped. The wheat was drilled late in November at the rate of 86 lbs. per acre, which is rather a high seed-rate. The crop ripened early in March. Meantime, it was three times irrigated. It yielded 903 lbs. grain and 1,490 lbs. useful by-product, together worth Rs. 36-12-10 per acre.

The percentage incidence of assessment works out for the gram and wheat respectively 18·44 and 15·68. There is, however, considerable doubt as to the accuracy of the reported outturn figures, and for this reason the figures are not entered in the tabulated statement.

*Mr. J. M. Cursetji, District Deputy Collector,*

Conducted three experiments, one each on groundnut, gram and *jowári*. The reports are drawn up with great care. In each case Mr. Cursetji estimates the cost of cultivation. He at the same time refers to the well-known tendency of cultivators to give to Government officers exaggerated estimates of outlays incurred in raising their crops.

The first experiment (No. 73) was taken on groundnut, which occupied a portion of a large number which is irrigable from a *dharan* and also from a well. The number extends to 9 acres 15 gunthas, of which 2 gunthas are *Pot Kharáb* The Pátasthal rate for the field is Rs. 15 and the soil-rate Rs. 12. This gives an assessment for soil and water combined of Rs. 2-14-4 per acre. The area under groundnut has gradually increased during the last four years, indicating, the experimenter thinks, that the crop is probably quite as profitable as the other crops of the rotation. This is probably a fair inference.

A portion of the field is usually double-cropped every year, millet (presumably Italian millet) being grown as a kharif crop followed by cold weather irrigated crops such as garlic, *ratálu*, wheat, onions, carrots, brinjals, gram, &c. Sugarcane was grown in each of the last three years. Chillies, on a small area, are grown each year. This crop and groundnut are the sole crops of the year on their respective areas. The groundnut tested was well manured by folding sheep and by the direct application of ordinary manure before sowing. The preparatory tillage was very careful. The seed was sown by hand, a common practice, but the seed-rate reported, 108 lbs. per acre, is quite double what is usual. The crop was irrigated four times by *pát* water and twice from the well. The season was unfavourable in as much as no rain fell when it was most wanted, and the late rains were so heavy that the crop was damaged. The crop is estimated at 8 annas. It was sown in June and ripened in January and yielded 1,547 lbs. nuts in shell per acre. This outturn, with the by-product, is valued at Rs. 72-5-2 per acre. The market rate for groundnut in shell, *viz.* 34 lbs. per rupee, is decidedly high. The experimenter's estimate of cost of cultivation indicates that the crop was grown at a profit of Rs. 8 per acre. Mr. Cursetji argues that as this was the case for a poor crop, a full average crop must necessarily be much more profitable.

This officer's second test (No. 74) was taken on gram. The crop is estimated at the average standard. The field has a Jiráyat black soil and bears an assessment of Rs. 1-11-0 per acre. It grows chiefly *jowári* and *bájri* as rain

crops, and wheat, linseed and gram in the rabi season. Small patches of tobacco, groundnut, carrots, &c., are occasionally grown, but are not helped by irrigation. In 1894-95 gram was grown as a second crop after *bájri*. Usually, however, no part of the holding is double-cropped. The area under gram was manured with ordinary manure at the rate of 8 loads per acre, also by folding sheep. Manure is reported to be given every second year, probably it is given at longer intervals. The experimenter debits the tested crop with half the value of the manure applied, and his estimate of cost of cultivation indicates that the crop was grown at a loss. Half the value of the manure is about equal to half the value of the crop, and the seed said to have been sown is about ⅓th of the outturn. The seed-rate, 114 lbs. per acre, is more than double what was required. The estimated cost of manure also probably much exaggerated. The season was unsatisfactory, because the late rains came very late and were far too heavy. The latter circumstance ought to have had a beneficial effect on rabi crops unless young seedlings were actually destroyed by the heavy rain. The crop yielded 640 lbs. pulse and 584 lbs. useful by-product, together worth Rs. 17-2-6 per acre. The incidence of assessment works out 9·83 per cent., which is perhaps high for a well-manured crop.

Mr. Cursetji's third experiment (No. 75) on irrigated *shálu jowári* gave, like Mr. Young's test in Khándesh, exceptionally good results. The crop yielded 3,069 lbs. of grain and 8,004 lbs. of useful by-product per acre. The sample of *jowári* weighed 99 *tolas* in my office as compared with 110 *tolas* reported. It is possible that the outturn therefore ought to be reduced by $\frac{1}{10}$th. Moreover the grain is valued at the high rate of 36 lbs. per rupee. The gross value of the crop is shown by the experimenter at Rs. 105-12-1. Probably Rs. 80 per acre would be nearer its actual worth. The field is small, 1 acre 26 gunthas. The soil assessment is Re. 1-2-7 per acre. Water is got from the Yerla right bank canal. The irrigation rate varies with the crop. Rs. 2 per acre is charged for rabi *jowári*. The soil is black. The field was heavily manured with ordinary manure and by sheep folding. The preparatory tillage and interculture were carefully attended to. The crop was only twice irrigated. The value of canal water for irrigation associated with careful tillage and liberal manuring is well shown in the exceedingly satisfactory outturn results. Mr. Cursetji's estimate of cost of cultivation indicates that the crop was grown at a net profit of Rs. 49 per acre. The Khátedár owns, in addition to the field tested, other lands extending to about 9 acres. The family consists of the cultivator, his wife, two daughters 15 and 10 years old, one son aged 4 years and one hired servant.

# SOUTHERN DIVISION.

## Belgaum.

Each sub-divisional officer was asked to do at least three ordinary tests and one special if possible. The First Assistant Collector made no experiments owing partly to detention at head-quarters on account of pressing magisterial work and partly to frequent changes in the personnel. Mr. Westropp carried out three tests, one each on *jowári*, *bájri* and gram, and Mr. Soman did two on *jowári*, one on gram and one on cotton.

Mr. J. L. Lushington, Superintendent, Land Records and Agriculture, S. D., conducted three tests required of him in this district.

*Mr. A. Westropp, Assistant Collector,*

Submits three experiments, one on *jowári* and *matki*, one on *bájri* and one on gram. The experimenter calls the crops 10, 8 and 11-anna ones. With regard to the first experiment Mr. Westropp says: "An average crop for the season was taken which was probably also the average crop of the particular field." The experimenter further says of the crop: "It was estimated by a Panch at a 10-anna crop, a true 16-anna crop being obtainable from the particular field under very favourable circumstances." Similarly the *bájri* is called an 8-anna crop and "the best crop the field would produce a 12-anna one." The crops tested are therefore 14 and 13-anna ones respectively according to the recognized method of estimating. The gram was about 16 annas. Experimenters should note that for the sake of comparison there must be a consistent and recognized system for the anna valuation. The system to be followed may be defined by stating that an average full crop which any field produces is called a 16-anna crop.

For all the fields the season was good except that for the *jowári* and *bajri* there was rather too much rain in September. The cultivation was 'not very good,' 'indifferent,' 'only fair'. The experimenter found the land weedy. Seed-rates are low; *jowári* 2½ lbs. with *matki* and *tur* ¾ lbs. each, *bájri* 4 lbs. with *kulthi* ⅔ lbs. and gram 16 lbs. *Jowári* and *bájri* were drilled, gram sown by hand following the small plough in November. In the *jowári* experiment *tur* and *matki* occupied one line out of eight and seed was only allowed to fall into every alternate journey across the field made by the four-coultered drill. The owner said his land would not bear closer crops. It is a reddish light friable soil with a sprinkling of stones. Of *bájri* there were three lines to one of *kulthi*. The soil here was lighter but not so stony. The gram was grown on black soil.

Outturn figures are :—

| | Anna Estimate. | Outturn of Principal Product per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | As. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 76 ... ... | 10 | 567 Jowári. 209 Matki. | 23 13 7 | 0 15 0 | 3·93 |
| Do. No. 77 ... ... | 8 | 314 | 9 4 4 | 0 9 1 | 6·12 |
| Do. No. 78 ... ... | 11 | 357 | 11 0 0 | 1 12 3 | 16·05 |

The amount of the by-product for the first two tests is not given. There is none for gram. In the first case it consists of chaff, *jowári* heads, *kadbi* and unripe *tur*. The *tur* was cut as fodder unripe for fear of the village cattle eating it in the field. In the second experiment the *kulthi* outturn is only 7½ *sers*. Mr. Westropp has added one-tenth to the gram outturn for the place occupied by safflower in the third experiment. I have not entered this estimate in the table. Mr. Westropp cut only 4 gunthas in the second and third tests. I fear the areas were not large enough to get results which can be confidently called average.

*Mr. N. C. Soman, District Deputy Collector,*

Sends four tests, two on *jowári*, one on mixed gram and safflower and one on cotton. Orders were issued to experimenters to the effect that as far as possible unmixed crops should be tested. Apparently Mr. Soman did not understand the meaning of the orders. He says an entire survey number is seldom sown with one crop. "The usual practice is to sow a variety of crops, gram, wheat, cotton, snfflower and *jowári*, in the same survey number." This is true but it does not follow that a crop occupying a portion of a survey number is unsuitable for experiment.

Mr. Soman's experiment on cotton is of little value, because the cotton had subordinate to it Italian millet and *ambádi* (hemp) which were both harvested before Mr. Soman saw the field. The value of these crops is estimated from hearsay evidence, but the valuation cannot be accepted as accurate. The cotton outturn alone is poor and the experiment is not reported. Mr. Soman ought to have had no difficulty in finding cotton growing alone in a portion of a survey number, if he could not in a whole survey number.

The *jowári* tests (Nos. 79 and 80) can conveniently be compared. The first field is generally overflowed by the Krishna when in flood, but was not this year. The soil is black; the season was favourable; the tillage good, but no manure was applied. The seed, about 4 lbs. per acre, was drilled late in August and the crop was reaped at the end of January. The second field has also black soil and was overflowed by a tributary of the Ghataprabha. A sprinkling of pulse had been sown, but the heavy crop of *jowári* killed out the subordinate mixture. The rainfall was all that could be desired for this crop. A little more in October and November would have been advantageous to the crop of the first field. Twenty loads of ordinary manure were given to the second field at the end of September after the floods had subsided. The seed was sown at the rate of 12 lbs. per acre in October and the crop was harvested on the 15th of February.

Outturn results, &c., are as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 79 ... | 18 | 472 | 930 | 14 6 8 | 0 15 9 | 7·13 |
| Do. No. 80 ... | 20 | 1,856 | 1,854 | 45 8 0 | 1 2 5 | 2·53 |

The crop of the first field is probably over-estimated at 18 annas.

The mixed crop (Exp. No. 81) of safflower and gram yielded fairly well. The safflower did not ripen for a month after the gram and the reaping of the crop was supervised by the Circle Inspector, Mr. Soman's camp being about 40 miles distant at the time. Gram is not grown alone in the district. It generally has subordinate rows of safflower. In the field of experiment every sixth row was mixed with safflower and gram. The field has black soil assessed at Re. 1-1-5 per acre. Tillage and season were both good; no manure was given. The field grows cotton, *jowári* and gram, the two latter mixed with minor crops. The yield of the tested crop is said to be the maximum for gram and 16 annas for safflower. It amounts to 543 lbs. gram and 123 lbs. safflower per acre together worth, with by-products, Rs. 16-14-4. The incidence of assessment is 6·44 per cent.

*Mr. J. L. Lushington, Superintendent, L. R. and Agriculture, S. D.,*

Submits three tests, one on wheat, one on gram and one on *tur*. None of the crops are single unmixed crops.

The wheat (Exp. No. 82) was grown on a black soil, *yeri bhumi*, field assessed at Rs. 2-9-0 per acre, and growing *jowári* one year followed by dry crop wheat or cotton the next. The season is called "very moderate, rain short." The cultivation "not very good but not quite indifferent." Five carts of village sweepings and cow-dung were applied per acre just before ploughing. The field was ploughed and cross-ploughed in May. Mr. Lushington says it is not usual to manure wheat in this district. The field was harrowed twice in September and once again four days before sowing. Forty-two pounds wheat were sown with a four-coulter drill about 15th October. Safflower with wheat occupied every eighth row. The safflower seed was sown through a separate tube (*yelsaddi*) attached by a rope to the seed drill and guided along the track made by one of the coulters of the seed drill, the amount of safflower seed being one-fourth of the wheat. The crop is said to be an eight-anna one for the field and the field a twelve-anna one as compared with other fields. The black soil was rather stiff, having a rather large admixture of clay. Mr. Lushington calculates that out of his test area 7½ gunthas were under wheat and ½ under safflower, and his calculations are based on the area cut being 7½ gunthas. I do not think this is satisfactory and have taken 8 gunthas and bear in mind the fact that safflower was subordinate.

Outturn, &c., per acre was :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 82 ... | 8 | 489 | 537 straw. 310 chaff. | 16 8 5 | 2 9 0 | 15·50 |

The gram experimented on (No. 83) was grown on a field of brown soil, *hulkeri masári*, with a stony surface. The experimenter in his notes says: "The field itself is a twelve-anna field and the crop is estimated at four annas, the *annewári* of the village for gram being six annas." In the statement the anna valuation is given as eight annas and this appears to be the correct valuation for the field. Safflower is said to occupy $\frac{1}{16}$th of the space growing gram. Before ploughing the land was lightly dressed with two to three cart-loads of cow-dung and sweepings. Ploughing began in April. The land was twice ploughed and twice cross-ploughed at intervals of 15 days each. In July it was harrowed once and again four times at intervals of a week in September-October. The seed, 31 lbs. per acre, was sown in the middle of October with a four-coultered drill. Safflower was sown by the following tube (*yelsaddi*) and in the proportion of 3 : 16 to the gram. The crop was poor owing to deficient rainfall. The tillage operations, especially the ploughing in the hot weather, must have been costly. The gross value of the outturn would certainly not meet expenses. The field grew Italian millet and kharif *jowári* in the two previous years.

Outturn, &c., results are as under:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | | Rs. a. p. | Rs. a. p. | |
| Experiment No. 83 ... | 8 | 172 | Not weighed. | 6 11 5 | 0 9 3 | 8·61 |

Mr. Lushington calculates the by-product as worth five annas per acre, but says it is nominal and does not give the quantity.

Mr. Lushington's last experiment (No. 84) was taken on *tur*. He says: "The object of the experiment is to show what extra outturn plus his *jowári* and minor pulses the eighth *tur* row gives to a *rayat* with a field rated in these districts at about Rs. 2-10-0 per acre, as generally experiments are taken with the *jowari*, &c., alone without this *tur* row being taken into consideration."

The main crop of the field was *jowári* and it was sown with a four-coultered drill. Every eighth row is *tur*. Mr. Lushington cut 64 gunthas in order that the minimum of 8 gunthas under the crop should be got. With the *tur* was sown *pundi* (hemp), the seed-rate of the *pundi* being one-tenth that of the *tur*.

The soil is black *yeri bhumi*. The field is said to be a twelve-anna field, and the *tur* a sixteen-anna crop for the field. The land was ploughed in May twice up and down and twice across, and was harrowed the same just before sowing. Manure at the rate of 3¼ cart-loads per acre was put on after the first ploughing. Seed was sown in July at the rate of 7⅔ lbs. per acre, which is a very high rate I think.

Outturn, &c., per acre :—

| | Anna-Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 84 ... | 16 | 82 | 175 | 3 6 0 | 2 10 0 | 77·7 |

Owing to the nature of the experiment the figure for incidence of assessment obtained is of no value. It is necessary to remember also that *pundi* was not tested.

To get the true incidence of assessment the Rs. 3-6-0 should be added to the acre value of the *jowári* and other minor crops. Mr. Lushington remarks: "The rayats say *tur* flowers seven times; the consequence is that at the time of cutting many pods are not thoroughly ripe or properly developed. The cutting of this particular *tur* took place on January 20th. All the *tur* fields were being cut at the time." It is true that *tur* continues to produce flowers for several months, and when the crop is ready, flowers and ripe fruit may be found on the same plant. The pods which ripen earliest may burst if harvest is delayed too long. If the crop is really good it is left until the leaves begin to drop and litter the ground. Even at this stage flowers will be found on the younger shoots or branches. If the crop is poor it is generally cut much earlier.

## Bija'pur.

Mr. Pánse, Acting Collector, asked his Assistant to do 14 and his Deputy to do 16 experiments. This appears to have been found rather too much, and the Assistant Collector was asked to do four altogether on *jowári*, *bájri*, wheat and gram; and the Deputy Collector also four on *jowári*, linseed, wheat and cotton. Mr. Pánse on reversion to the Assistant Collector's office did one experiment on *jowári* and two on cotton. Mr. Page did 3 on *jowári*, linseed and wheat, and Mr. Artál, District Deputy Collector, five, one each on *bájri*, wheat, linseed, gram and late *jowári*.

*Mr. G. D. Pánse, Assistant Collector,*

Reported three experiments, one on *jowári* and two on cotton. The experimenter has sent about fifty pages of notes forming a most interesting essay on Bijápur generally. A good deal of it however is repetition. Mr. Pánse appears to have a set form of remarks. He has taken considerable care in finding out what the expenses of cultivation are and what amount of actual profit the cultivator gets. It appears that Bijápur cultivators are lazy and ignorant and involved in debt. On the other hand the land is good and cultivation yields immense profits.

Mr. Pánse thinks the Tagái system is doing good because it teaches the people what an absurdly high interest their Sávkárs charge. He is surprised at the conservatism of the Bijápur rayats.

Dry-crop cultivation is described by the experimenter. Lands are manured or rather slightly dressed with manure once in three years. They are ploughed with a heavy ten-bullock plough once in ten or twelve years. The small plough is used every year. After ploughing the land is harrowed with a two-bullock harrow, and seed is drilled. The land is weeded once or twice with a bullock hoe and sometimes by hand.

The first experiment (No. 85) is on *jowári*. The whole field measures 23 acres 18 gunthas and is assessed at Rs. 16 The soil is black *yeri-bhumi*. The crop was exceptionally good and showed signs of most careful cultivation. The anna-estimate of the crop 16 is, I imagine, too low. The season was favourable. Outturn was 1,469 lbs. grain, 964 lbs. chaff, and 13,790 lbs. *kadbi* per acre, which is far and away above what can generally be expected. There was also *tur* untested; every eighth row was *tur*. Manure was applied; Mr. Pánse says 68 cart-loads of cow-dung and rubbish at 4 annas the cart-load for the whole field.

The entire field gives an outturn of 34,438 lbs. *jowári*, 22,261 lbs. chaff, and 3,283 maunds *kadbi*, valued at Rs. 671-9-8, Rs. 98-6-6 and Rs. 205-3-0, or in all Rs. 975-3-2. Average value per acre comes to Rs. 41-9-4, and incidence of assessment to 1·64 per cent. Mr. Pánse gives the following details of cultivation expenses for the whole field:—

| Operation. | Bullocks. | Days. | Wages. | Cost. | Men. | Days. | Wages. | Cost. | Total. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Rs. a. p. | Rs. a. p. | | | Rs. a. p. | Rs. a. p. | Rs. a. p. |
| Ploughing ... ... | 8 | 12 | 0 2 4 | 7 0 0 | 4 | 12 | 0 3 0 | 9 0 0 | 16 0 0 |
| Manuring ... ... | | | 88 cart-loads at 4 per rupee. | | | | | | 22 0 0 |
| Harrowing ... ... | 4 | 6 | 0 2 4 | 1 12 0 | 2 | 6 | 0 3 0 | 2 4 0 | 4 0 0 |
| Sowing ... ... ... | 4 | 6 | 0 2 4 | 1 12 0 | 3 | 6 | 0 3 0 | 3 6 0 | 5 2 0 |
| Seed ... ... ... | | | 46 sers, 72 tolas, at 20 per rupee. | | | | | | 2 5 6 |
| Weeding ... ... | 4 | 5 | 0 2 4 | 1 7 4 | 4 | 5 | 0 3 0 | 3 12 0 | 5 3 4 |
| Removing grass ... | | | 79 | women at 1 anna. | | | | | 4 15 0 |
| Reaping ... ... | ... | ... | ... | ... | 12 | 3 | 0 3 0 | 6 12 0 | 6 12 0 |
| Thrashing ... ... | 16 | 2 | 0 2 0 | 2 0 0 | 5 | 2 | 0 3 0 | 1 14 0 | 3 14 0 |
| Cart hire ... ... | | | 3 carts for 2 days at 8 annas per day. | | | | | | 3 0 0 |
| Baluras... ... ... | ... | | ... | ... | ... | ... | ... | ... | 37 11 8 |
| Watchmen ... ... | | | 2 at Rs. 6 per month | | for 4 months. | | | | 48 0 0 |
| Assessment ... ... | ... | ... | ... | ... | ... | ... | ... | ... | 16 0 0 |
| Local cess ... ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 0 0 |
| | | | | | | | Total expenditure ... | | 175 15 6 |

Total profit on the holding Rs. 799-3-8. Two bullocks and a man is called a *galle* and the charge per *galle* is 5 annas 4 pies. This is an extremely cheap rate. *Baluta* is what is paid to the village servants. It is not fair to charge it all against the land, as a good deal of it, in fact most, is remuneration for private service. There are 8 *Balutadárs* and they get, according to Mr. Pánse, about $\frac{1}{24}$th of the total produce between them. The expenditure on watchmen seems to me excessive. It is not clear why the field should require watching for four months.

Mr. Pánse's two cotton experiments are not satisfactory; only one picking was taken from each field. Usually the cotton of the district is picked twice. Mr. Panse says the yield of the second picking may vary from $\frac{1}{6}$ to $\frac{1}{2}$ of the first picking according to the character of the season. I cannot enter the results of these experiments in the tabulated statement of results. The season was not favourable and the yield is estimated at 13 annas in both cases. The cultivation in both fields was indifferent. Neither field was manured last year; both get manure every third year. In both fields the seed-rate is 12½ lbs. per acre. The two experiments were done on the same day in the same village. The cotton is valued at rather over 17 lbs. per rupee, which is a cheap rate. The yield of the first experiment comes to 155 lbs. and of the second 225 lbs., valued at Rs. 8-14-2 and Rs. 12-14-6 respectively.

Mr. Pánse calculates the expenditure, including assessment and local cess on the fields, to be respectively Rs. 2-12-7 and Rs. 2-6-6 per acre. The calculations

are based on exceptionally low rates for bullock and manual labour. The profit per acre comes to Rs. 6-1-7 and Rs. 10-8-0. Incidence of assessment comes to 13·42 and 7·99 per cent. respectively.

*Mr. H. Page, Assistant Collector,*

Submits three experiments, one on late *jowári*, one on linseed and one on wheat.

The wheat and linseed (Exp. Nos. 86 and 87) were on the same field and were tested on the same day. There were subordinate rows of safflower in both the wheat and linseed. Mr. Page should have disregarded the safflower if he could not test it. He estimates that in the wheat part one guntha in nine was under safflower and in the linseed part 1⅓ in 9⅓, and assumes in calculating acre averages that wheat and linseed actually growing on 9 and 9⅓ gunthas respectively really only occupied each 8 gunthas. I have made the necessary corrections. The field measures 25 acres 2 gunthas and is assessed at Rs. 25 or just under Re. 1 per acre. The season was fair for wheat and good for linseed; cultivation is described as good. No manure was applied to the part of the field under wheat but 25 cart-loads to 4 acres under linseed.

The field has black soil and grows a variety of dry crops—*jowári*, wheat, safflower, gram, linseed, cotton, hemp and sesamum. Seed-rates are given as 18⅔ lbs. wheat and 5½ lbs. linseed, in each case less than half what is ordinarily required. Wheat was sown with a four-coultered drill in the middle of October and linseed with a three-coultered one at the end of September. Mr. Page says that every eighth row of wheat and every sixth row of linseed were "followed by a row of safflower." As a four-coulter drill was used in the one case and a three-coulter drill in the other, I take this to mean that safflower was sown mixed with the wheat in every eighth row and with the linseed in every sixth row, the safflower being sown with a following tube (*yelsaddi*).

The outturn figures are :—

| | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | Principal Product. | By-Product. | | | |
| | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 86 ... | 276 | 209 | 8 5 11 | 0 15 11 | 11·88 |
| Do. No. 87 ... | 294 | ... | 12 9 7 | 0 15 11 | 7·89 |

The third test (No. 88) was on rabi *jowári* growing on black soil assessed at Re. 1-1-3 per acre. Seed-rate 8 lbs. per acre; no manure for the last twelve years; season fair; cultivation good. The field grows cotton, linseed, safflower, *jowári*, &c.

Outturn, &c., results are :—

| | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | Principal Product. | By-Product. | | | |
| | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 88 ... | 362 | 1,090 | 8 12 7 | 1 1 3 | 12·27 |

*Mr. R.-C. Artál, District Deputy Collector,*

Submits five tests, one each on *bájri*, wheat, gram, linseed and late *jowári*. The sample *ser* of *bájri* was 4½ *tolas* and of wheat 2 *tolas* short of the recorded weights. Except these points the experiments are quite satisfactory and the remarks full and clear. The care with which the experiments have been made gives confidence in the trustworthiness of Mr. Artál's weighments and the differences in weights may be safely put down to some mistake in packing or loss in transit. I cannot help remarking that Mr. Artál appears to have a set form for his remarks, as they are for pages the same word for word in all his experiments. In all the experiments the fields had rows of subordinate crops and Mr. Artál has deducted 2 out of 12 gunthas for them in the first two and 1¼ out of 11¼ in the last three. As these deductions can only be approximate, it is better to consider the area cut as 12 or 11¼ and not 10 gunthas, and bear in mind the fact that there are subordinate crops. The calculation figures have been changed accordingly.

The *bájri* field (Exp. No. 89) measured 11 acres 35 gunthas plus 2 gunthas *Kharáb*, and is assessed at Rs. 8 or Re. 0-10-9 per acre. The soil is said to be a sandy loam. No manure was applied. The cultivator stated that the field had been manured four or five years ago, but could not give the amount. Anyway its effect would hardly be felt now. Seed-rate was just under 3 lbs. per acre, which is rather low. The seed was drilled with a three-coulter drill early in August. Mr. Artál remarks that the lateness of the sowing was due to the failure of the early rains. The rotation of crops is undefined and the field appears to grow all sorts of crops, *bajri*, sesamum, *mug*, hemp, *kulthi*, *jowári*, onions, chillies, tobacco, *tur*, *alsandi*, gram and black gram. This year the *bajri* had a subordinate crop of *kulthi*, this pulse being sown with the *bájri* in every sixth row.

Before sowing the land was thrice ploughed and hoed once with four bullocks and twice with two. After drilling the seed was covered by a light hoe and twenty days afterwards a hoe was worked between the rows. There was no hand weeding. The crop is estimated at 14 annas. The acre outturn was 619 lbs. grain and 2,183 lbs. by-products valued at Rs. 9-10-1. Incidence of assessment is 6·97 per cent. *Bájri* grain has been valued at 67 lbs. per rupee and the by-products at about 47 cwts. Both these rates are extremely low. Mr. Artál priced *bájri* at 51 lbs. and by-product at 8 cwts. last year in the same district.

The second test (No. 90) was on unirrigated wheat. The land is light black soil and is assessed at Re. 1-0-10 per acre. The seed, 31 lbs. per acre, which is low, was drilled in the last half of October. The field is never manured. It was ploughed and harrowed. After sowing it was neither hand-weeded nor bullock-hoed. The yield was adversely affected by the shortness of the rainfall, and the anna valuation is 10 to 12. The yield per acre was 379 lbs. grain and 450 lbs. by-product. The grain has been valued at 11 *sers* or 42¾ lbs. per rupee, and the by-products at 9⅗ cwts. This again is, I think, much too low, at any rate for the grain. Mr. Artál made three experiments on wheat in 1893 at the same village and the prices he then quoted were 29⅔ lbs. grain and 10$\frac{6}{7}$ cwts. by-products. Incidence of assessment works out to 11·33 per cent. The field is cultivated by a tenant who pays the assessment and gives half the produce to the landlord.

Mr. Artál's third experiment (No. 91) was on gram grown on a field of light black soil, *kárlu*, assessed at the rate of Re. 0-15-4 per acre. The rotation is undefined, but the field has grown in the past three years late *jowári* and linseed alternately with wheat and safflower. The season was favourable. The field is never manured. The cultivation is described as good. Mr. Artál estimates the outturn at from 13 to 15 annas. As the season and cultivation were both good, it is not understood why the anna valuation should be below 16. The field was twice ploughed with a light plough and about 39 lbs. of seed were drilled in October with a four-coultered drill. There was no hand-weeding. The outturn was 597 lbs. pulse per acre valued at Rs. 15-10-0. In every eighth row safflower was sown and its yield is not taken into consideration for reasons given above. It should however be borne in mind. Incidence works out to 6·13 per cent.

Linseed was tested on the same day as gram and at the same village. The soil is black soil, *yeri bhumi*, assessed at Re. 0-15-3 per acre. The season was fair. The field is never manured. Safflower was sown in every eighth row, and I have considered the test area as above, also in the next experiment, 11¼ and not 10 gunthas. The cultivation is good; the rotation undefined, but wheat with safflower was grown alternately with cotton during the past three years. About 6⅕ lbs. seed were drilled with the four-coultered drill in October. Outturn was 190 lbs. seed, valued at Rs. 8-13-2. Incidence of assessment comes to 10·95 per cent. Linseed is valued at 22 lbs. per rupee. The yield, which is poor, is estimated as a twelve to fourteen-anna crop.

Mr. Artál's last experiment (No. 93) done at the same village and the day after the gram and linseed tests is on late *jowári*, linseed (untested) being subordinate. The soil is black assessed at Re. 1-0-4 per acre. Season and cultivation are described as good. Manure is never applied. Seed-rate is 3½ lbs. per acre drilled with a four-coultered drill in the latter half of September. The crop is said to have been a fair average one for the season, but Mr. Artál only estimates it at ten to twelve annas. The field grows *jowári*, linseed, hemp, wheat, safflower, gram, tobacco, &c. Outturn of grain was 389 lbs. and of straw 1,405 lbs. valued at Rs. 8-14-11. Incidence of assessment comes to 11·42 per cent. *Jowari* is priced at 16 *sers* or 56½ lbs. per rupee. *Kadbi* is sold by what is known in this district as the *kát*—as much as 4½ *háths* of rope will go round. The price of a *kát* is eight annas.

As there was a good deal of dry-crop experimenting done in Bijápur, it will be useful to show the results together here :—

| Crop. | Anna Estimate. | Outturn per Acre. | | Value of Outturn | Assessment per Acre. | Percentage Incidence of Assessment. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | | |
| Jowári ... | 16 | 1,469 | 964 chaff. 13,790 kadbi. | 41 9 4 | 0 10 11 | 1·64 | Tur subordinate not tested. |
| Do. ... | 8 | 362 | 1,090 | 8 12 7 | 1 1 3 | 12·27 | |
| Do. ... | 10 to 12 | 389 | 1,405 | 8 14 11 | 1 0 4 | 11·42 | Linseed subordinate not tested. |
| Bájri ... | 14 | 619 | 2,183 | 9 10 1 | 0 10 9 | 6·97 | Kulthi subordinate not tested. |
| Gram ... | 13 to 15 | 597 | 437 | 15 10 0 | 0 15 4 | 6·13 | Safflower subordinate not tested. |
| Linseed ... | 12 to 14 | 190 | 341 | 8 13 2 | 0 15 3 | 10·95 | Do. |
| Do. ... | 12 | 294 | ... | 12 9 7 | 0 15 11 | 7·89 | Do. |
| Wheat ... | 8 | 276 | 209 | 8 5 11 | 0 15 11 | 11·88 | Do. |
| Do. ... | 10 to 12 | 379 | 450 | 9 4 6 | 1 0 10 | 11·33 | Do. |
| Average for dry crops... | ... | ... | ... | 13 11 9 | 0 14 11 | 6·78 | |

## Dha'rwa'r.

Experiments on *ragi*, *jowari*, gram, wheat and linseed were ordered from this district. Mr. Lucas omitted to experiment owing apparently to his illness. Mr. Anderson did three experiments, one each on linseed, *jowári* and wheat. Mr. Bhángáonkar could not find in his charge a field growing linseed without any mixture and so gave that part of the programme up and tested gram and wheat,

*Mr. F. G. H. Anderson, Assistant Collector,*

Reports three experiments, one each on *jowári*, wheat and linseed. The test area in the first and third tests was only 5 gunthas in each case and therefore below the prescribed minimum. Mr. Anderson explains that the *jowári* crop was so heavy that it was difficult to effectively superintend an experiment over a

larger area. A *jowári* test does not require much time or trouble, however heavy the crop may be, and the explanation cannot be called satisfactory particularly in regard to the linseed, which generally has less bulk than any other crop. The *jowári* (Exp. No. 94) grew on a brown-black soil field. The soil is not of the first quality, the fault being the red admixture which gives the brownish colour. The field grows cotton, *jowári*, wheat, &c., and is assessed at Re. 0-13-2 per acre. It was manured with five cart-loads per acre cattle-dung and refuse. The season was exceptionally favourable. The rainfall was excessive for pure black soil but was just right for the field of experiment, the soil on account of the red admixture being apparently less dense than pure black and therefore more absorbtive of heavy rain. The cultivation is described as ordinary good. Eleven pounds seed per acre drilled about the end of June produced a crop which ripened at the beginning of December. Mr. Anderson says the crop was "a full crop above the year's average and was taken as a sample of what the rayat regards as his highest reasonable expectation on favourable land and with good season." The by-product was weighed on rough country scales. Mr. Anderson says the weight is approximately correct.

The outturn, &c., results are as under :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 94 ... | 20 | 1,393 | 4,000 | 25 4 0 | 0 13 2 | 3·25 |

Both grain and by-product are valued at a cheap rate.

The wheat field (Exp. No. 95) selected for experiment has black soil of medium quality. It grows cotton, *jowári*, Italian millet, &c. One year kharif crops are grown, the next year rabi crops. The season was not altogether favourable. Sudden heavy falls of rain after the crop was sown did some harm, and apparently the soil did not hold sufficient moisture to mature the crop properly, as "it dried rather too soon." The crop is average for the season. The cultivators delayed sowing too long, expecting late October rains, which however did not come. There were subordinate rows of safflower with the wheat. The experimenter took 8½ gunthas as test area, of which he considered ½ guntha was occupied by safflower. It is better to consider the whole test area as occupied by wheat, and bear in mind that there was a subordinate crop which was not tested. The by-product was not weighed and is said to be unsaleable and of nominal value.

The outturn, &c., results for the wheat were as under :—

| | Anna Estimate. | Outturn of Grain per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | As. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 95 ... | 11 to 14 | 391 | 16 10 7 | 1 10 11 | 10·09 |

The linseed (Exp. No. 96) tested by this officer was a second crop after rice on second order rice land. The second crop is taken every year if the soil is moist enough after the rice is reaped. Gram, *vál* or linseed are the usual second crops. The season was only fair. There was not enough late rain for a good linseed crop. The rice was manured but not the linseed. The crop was grown at very little cost. The field was once ploughed and the seed sown in the furrow behind the plough and covered by the soil moved in making the next furrow. Twelve pounds per acre of seed sown in December produced a crop which ripened in March. The yield is 244 lbs. worth Rs. 11 per acre. This is classed as a twelve-anna outturn. The incidence is 23·39 per cent., which is moderate considering that rice bears most of the assessment.

*Mr. K. N. Bhángáonkar, District Deputy Collector,*

Submits two experiments, one on wheat and one on gram. He says that unmixed linseed was not to be found, and his last year's experiment performed on mixed linseed was rejected, and he therefore could not do one on that crop this year.

The wheat was grown on rich black soil, *yeri bhumi*. It was manured at the rate of 2¼ cart-loads of manure per acre. The cultivation is described as good but Mr. Bhángáonkar does not enter into particulars. The field grows ordinary dry crops such as *jowári*, cotton and unirrigated wheat. This year the wheat had subordinate to it safflower, the experimenter says, one row of safflower to six of wheat. The seed was sown with a three-coultered drill in the middle of October. I fail to see how six rows of wheat to one of safflower could be sown with a three-coultered drill. There may have been 5 rows of wheat and 1 of safflower, but it is more probable that every sixth row was mixed safflower and wheat. The crop ripened in the middle of January.

Outturn, &c., per acre:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 97 ... | 12 | 381 | 426 | 13 11 9 | 1 0 2 | 7·35 |

The experimenter himself calculated on a cut area of 12 gunthas, allowing 2 gunthas for safflower. As usual, I consider this unsatisfactory and prefer to bear in mind the fact of the subordinate crop's existence and calculate on the area of 14 gunthas.

This officer also tested gram (No. 98). The same remarks about the area tested apply. Safflower was again subordinate in the same proportion as with the wheat. The soil is black soil "not of the richest." The field grows all sorts of dry crops, green gram, *jowári*, cotton both indigenous and exotic, pigeon pea, large-fruited dolichos, niger-seed, sesamum, hemp, Italian millet, safflower, gram, linseed, cucumber, &c. This year the season was not very good for gram, the rainfall being deficient. No manure was used. Cultivation was good but details are not given.

Outturn, &c., per acre:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 98 ... | 8 | 162 | 58 chaff. 23 stalks. | 5 6 5 | 1 0 3 | 18·80 |

## Kola'ba.

Sample *sers* of three tests made by Mr. Brooke were received in this office in December last. But report concerning these has not yet been forwarded. Messrs. Kánga and Thakár did between them the work allotted to the District Deputy Collector.

Messrs. Hearn, Wilkins and McIver of the Konkan Revenue Survey have altogether submitted four tests on rice from this district.

*Mr. R. E. Kánga, District Deputy Collector,*

Submits an experiment on rice (No. 99) which was carefully made. The soil was black soil and the field always grows rice followed by a second crop of *val.* The *val* has not been tested and the incidence of assessment is taken on the single crop. Even thus it is low enough—12·95 per cent. The seed sown was at the rate of 117 lbs. on $6\frac{6}{7}$ gunthas of seed-bed per acre. The rate seems rather large and the experimenter says that the seed was considered to have been thickly sown. Ráb was burnt on the 6 gunthas of seed-bed, 40 loads of cow-dung and 4 loads of rice straw. The Collector remarks: " It appears that with cow-dung and rice straw for ráb, *i.e.*, without any *tahal* (tree loppings) or fine grass, a good field in a fairly good season with good cultivation produces a 14-anna crop or $\frac{7}{8}$ of a good average crop, and a return of 26 times the seed sown. It is fair to presume that with a *good* season the return would have been thirty-fold; and the experiment confirms the result of former experiments, showing that where cow-dung is obtainable in reasonable quantity, *tahal* is not a necessity."

The local estimate 14 annas appears to have been ascertained with care. Yet the yield is more than maximum according to the formulæ. This is only another proof that the formulæ want revision. The season was, on the whole, good. Late in the year a heavy fall of rain saved the rice crop. The land is assessed at the rate of Rs. 7-10-3 per acre. The outturn of rice was 3,045 lbs., and of straw 2,462 lbs., per acre. The latter seems rather low. The rice is priced at 57 lbs. per rupee, and the straw at 450 lbs. or 150 bundles per rupee. Incidence on the single crop comes to 12·95 per cent.

*Mr. G. P. Thakár, District Deputy Collector,*

Sends two experiments on gram. The reports are carefully made and quite satisfactory.

The first field (Exp. No. 100) was at Vinchavli in the Mángáon táluka. The soil was deep black, locally known as a Malkhandi Rabi. The field grows gram every year. The season was good and so was the cultivation. The later rains were very favourable for rabi crops. The moisture retained by the soil lasted longer than usual and was useful in nourishing the crop until it was quite ripe. Of the cultivation Mr. Thakár says: " The cultivator seems to be very careful. Small dams were put up by him on all sides of the plot so as to prevent the manure and water escaping from it. The plot was carefully weeded and twice ploughed. Some care is also required in sowing. The end of the drill must enter the ground to a certain depth. If it remains above that, the seed would fall in the upper dry layer, which would prevent it from germinating. If the seed is placed too deep in the soil, the pressure of the earth over it might spoil it. All the necessary precautions were taken, and the cultivation may be called very good."

The field was lightly dressed with manure in May, one and a half cart-load being put on. Seed was sown with a single drill in November—79 lbs. per acre being sown. This is a very high seed-rate. Mr. Thakár thinks a large amount of seed is required in the Konkan because the soil is inferior and the individual plants do not grow very large.

The field of the second experiment (No. 101) has black soil, *galvat jamin.* It also grows gram continuously. It was not manured, and the cultivation is said to have been indifferent, if not bad. The field was not weeded properly nor were the dams, referred to in the above experiment, built. It was twice ploughed. Mr. Thakár says the ploughing seems to have been indifferent, though we are not told how this showed itself.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn of Pulse per Acre. | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | As. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 100 ... | 16 | 296 | 10 0 0 | 0 10 1 | 6·30 |
| Do. No. 101 ... | 12 | 275 | 9 5 4 | 0 15 6 | 10·38 |

*Mr. E. H. Hearn, Deputy Superintendent, Konkan Revenue Survey,*

Sends an experiment (No. 102) on rice, *Mudga*. The test is not altogether satisfactory. Season and cultivation are described as good and the crop an 18-anna one. The land is assessed at Rs. 6-12-2 per acre and grows rice every year. Seed-rate and area of seed-bed were not obtainable. The seed-bed was rábed with cow-dung, branch wood and straw, but amounts are not given. The rest of the field was not manured. The outturn was 2,062 lbs. paddy and 2,300 lbs. straw with 150 lbs. chaff worth in all Rs. 36-4-2. Incidence of assessment works out to 18·64 per cent. Mr. Hearn says a *ser* is equal to 60 *tolas*. He calculates however on one of 61¾ *tolas* and his sample half *ser* weighed in this office 29¼ *tolas*. Rice is valued very cheap at 61½ lbs. per rupee.

Mr. Hearn also sends a test on *tur*. He has calculated the outturn at the rate of 82 *tolas* per *ser*. The sample *ser* received gave only 78 *tolas*. Mr. Hearn was asked if he had any explanation and has merely replied that as a matter of fact 78 *tolas* went to the *ser*. I have therefore corrected his figures and given the outturn in lbs. at 78 *tolas* to the *ser*. In answer to a further reference Mr. Hearn says the 82 *tolas* was what he got by using a balance scale and he supposes that this balance must have been wrong. The experimenter gave no notes explaining his figures; so he was asked how he calculated the value of the by-product. He says the Pátil gave one anna as the value of the by-product from 10 gunthas and he has therefore taken 4 annas as the value per acre. This gives the low rate of 10 cwts. per rupee. Pátils are naturally inclined to value things lightly, and *tur* chaff and leaves are probably really worth more.

The field measures 20 acres plus 3 acres 14 gunthas *Pot Kharáb* and is assessed at annas 4 per acre. It is reddish soil at the top of a small hill. It grows *nágli* or *vari* one year followed by *tur* the next and then two or three years fallow. Cultivation and season were good. The experimenter says: "Ráb was burnt on the soil in the month of May. Cow-dung and grass." This must have been for some other crop, probably rice or *nágli*. No further manuring was given. The experimenter says: "The field is ploughed up and then the seed sown broadcast and then ploughed again." Outturn was 320 lbs. per acre valued, with by-product, at Rs. 10-4-0 giving an incidence of 2·44 per cent. Mr. Hearn says the cultivators do not understand the system of anna valuation and he does not give it. The crop corresponds to a 13-anna one; but as the experimenter, who knows the Konkan well, says the crop was a good one for the soil on which it was grown, I have put it down at 16 annas.

*Mr. W. D. Wilkins, Assistant Superintendent, Konkan Revenue Survey,*

Submits one experiment (No. 104) on rice, *Tavsál Halva*. The experimenter admits that this was about the only crop left standing and he cannot tell whether it was an average one or not. The season is said to have been favourable and the villagers state that the crop was a 16-anna one. I cannot admit that the anna valuation is anything more than a guess, probably wrong, for the yield is very poor. Seed-rate is stated to be 29 lbs. sown in 2·86 gunthas of bed for one acre. Mr. Wilkins works out this result very carefully, but not only does the seed-rate itself appear low but the area of the seed-bed is too small. The field itself was unmanured but the seed-bed was rábed in the following way:—About 500 sheep were folded for 3 successive days on a piece of rice-land measuring about 3½ gunthas in December 1894 and 16 head-loads of brushwood were spread thereon in January. Later in the year, two head-loads of straw were spread on the brushwood and two of fine grass on the straw and dry leaves on the grass. The whole was moistened with water, sprinked with soft earth and burnt at the end of February. The plot thus prepared was afterwards ploughed to receive the seed, which was sown broadcast at the end of May.

The land bears an assessment of Rs. 5-3-5 per acre. The soil is a reddish brown soil growing rice only every year and no second crop. The yield of paddy came to 1,075 lbs. per acre and 950 lbs. straw (dried). The grain is valued at 54 lbs. per rupee and the straw at 2¼ cwts. Total value of yield comes to Rs. 23-3-0 and incidence to 22·49 per cent.

*Mr. J. A. McIver, Assistant Superintendent, Konkan Revenue Survey,*

Submits one experiment (No. 105) on rice, *Divályia*. The *ser* is said to weigh 62 *tolas*, but the sample only weighed in this office 59½ *tolas*, and it is

doubtful how much of this is due to dryage. Except for this, the experiment is clearly reported.

The soil is red gravelly soil assessed at the rate of Rs. 2-15-1 per acre. It grows rice every year; Panvel and Divályia rice alternately. The rice-bed measured 12½ gunthas, and 2½ gunthas of seed-bed were used for this area and rábed; amount of ráb materials not given. The rest of the field was unmanured. Seed-rate comes to 30½ lbs. on 8 gunthas of seed-bed per acre.

Outturn results are:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Bundles. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 105 . | 15 | 1,602 | 592 | 37 6 9 | 2 15 1 | 7·86 |

Price of paddy 51 lbs. and straw 100 bundles per rupee. The straw rate is very high.

## Ratna'giri.

Experiments on *rági*, *kodra* and sesamum were directed to be made in this district. Mr. Crump, the First Assistant, did no experiments owing to his transfer to the Judicial Department, and his successor did not arrive in time for the work. Mr. Chuckerbutty has submitted one test on *rági* and two on niger-seed, and Mr. Kelkar, the District Deputy Collector, one on *rági*, one on *kodra* and two on niger-seed.

### *Mr. A. W. G. Chuckerbutty, Assistant Collector,*

Submits three tests, two on niger-seed and one on *rági*. Mr. Chuckerbutty calls the niger-seed *kála til* or sesamum; but from his remarks and from the samples received it is clear that the crop was niger-seed. Mr. Chuckerbutty's mistake appears to be due to the vernacular name in Ratnágiri being *kárala til*. All three experiments are laboriously worked out and I think satisfactory. They were all done in the same village and at the same time, 8th and 9th November. Sample *sers* received here all weighed slightly less than what the experimenter records. This is almost certainly due to dryage, as the experimenter weighed his grain two or three days after cutting. The difference is however slight. In all three experiments the land is *varkas* land of an average class, *bharad varkas*, sloping stony ground, for the Rájápur táluka. Mr. Chuckerbutty observes: "The village is situated on a creek, but as is usually the case in a hilly táluka, the cultivated *varkas* land forms the slope of hills of moderate elevation above the sea-level." In each case a few years of cropping are followed by an equal or greater number of years of fallow.

The outturn from the niger-seed is shown below:—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 106 ... | 12 | 196 | 208 | 11 5 3 | 0 5 11 | 3·26 |
| Do. No. 107 ... | 14 | 255 | 280 | 14 1 11 | 0 4 0 | 1·77 |

By-products are valued at 2½ cwts. per rupee. They are of practically no use. Neither field was manured. In the case of the second field, Mr. Chuckerbutty has cut only 5 gunthas and says there were only 6¼ gunthas altogether under the crop. It is a pity to choose such small patches for obvious reasons, and no good reason is given for contravening the standing orders on the subject. The seed-rates are both high, particularly in the second experiment. True average seed-rates cannot be obtained where only a small area is planted.

This officer's experiment (No. 108) on *rági* and *vari* mixed was taken in the same survey number as his first test on niger-seed, but in a different Phálani number. Here again there was only a small plot of 6 gunthas, and Mr. Chuckerbutty cut the whole of it. The area is below that required by standing orders. The season is said to have been good both for this and the niger-seed. Mr. Chuckerbutty states that this plot of ground was fallow from 1891-92 to 1894-95, and that it will grow *harik* next year, *til*, presumably niger-seed, the year after, and *sáva* in 1898-99, when it will again be left fallow. It appears to be cropped for about 4 years and to lie fallow for the next 4 years or so. The *rági* grown is known as *Dhondga Nachni* and is a somewhat late ripening variety. Seed-rate comes to about 13½ lbs. per acre sown on a rábed bed. The amount of ráb materials and area of seed-bed are not given. Mr. Chuckerbutty says the area and the exact quantity of seed are unknown. The seed was sown in the beginning of June and the seedlings were transplanted a month later. 1½ maunds of dried fish were applied, a small quantity being put in each hole into which a seedling was put.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 108 ... | 12 | 747 Rági<br>83 Vari | 692<br>27 | 21 5 1 | 0 5 10 | 1·71 |

Mr. Chuckerbutty states that the *vari* was not intentionally sown but a small quantity of *vari* seed had got mixed with the *náchni* "presumably on the threshing floor." This may be so, but *vari* is sown with *náchni* in Ratnágiri, and at any rate the transplanting of the two must have been intentional.

*Mr. V. R. Kelkar, District Deputy Collector,*

Submits four experiments, two on niger-seed and one each on *nágli* and *harik*. Mr. Kelkar prices *nágli* straw at 21 lbs. per anna in his notes and 42 lbs. in his calculations. On reference, the correct figure is said to be 42 lbs. *Nágli* straw is a coarse fodder. The experiments are all carefully done, and fully reported. Mr. Kelkar has taken as much pains as usual.

The *nágli* (Exp. No. 109) was grown on *bharad varkas* land assessed at Re. 0-6-2 per acre and the experimenter states that attempts are being made to turn it into Kharif. The tenure is Rayatvári. The field measures in all 12 acres 4 gunthas, and this year the crops were as follows :—

| Crop. | Area. | |
|---|---|---|
| | A. | g. |
| Rice ... ... | 3 | 27½ |
| Hemp ... ... | 0 | 5 |
| Nágli ... ... | 0 | 21 |
| Fallow ... | 7 | 30½ |
| Total ... | 12 | 4 |

If the rainfall is sufficient, rice is sown in parts, if not *tág* (*san* hemp). Of the fallow portion 20 gunthas are *Pot Kharáb* and $1\frac{1}{2}$ gunthas are taken up for Musalman burial purposes. The rest is inferior and under grass. It is stated that the half acre under *nágli* always grows a crop and is never fallow ; such crops as *nágli*, *harik*, *vari*, niger-seed and *udid* are taken. The *nágli* was grown on a seed-bed, $3\frac{3}{4}$ gunthas in area, rubbed with 7 head-loads of grass and *kaval*. Sifted earth mixed with rice husks was spread on top and the whole burnt. After the first showers $3\frac{1}{2}$ *sers nágli* were sown broadcast and then ploughed in. Seedlings were transplanted about 10th July. Area of seed-bed comes to $7\frac{1}{7}$ gunthas per acre and seed $8\frac{1}{13}$ lbs. The field was ploughed and cross-ploughed early in June and again ploughed in July before transplantation. One man and four women did the work of transplanting. The man made holes with a pointed pole about 3 inches apart. One woman followed him and put pieces of dried fish in each hole. Three women followed her and planted one or two seedlings in each hole and filled it up with earth. One man watched the transplanted seedlings for 3 days, as jackals and crows would damage them for the sake of the fish. The field was not well weeded. Nearly 21 maunds of fish manure costing Rs. 6 were used.

Outturn, &c., per acre :—

| | Anna Estimate. | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 109 ... | 14 | 1,433 | 2,110 | 41 4 0 | 0 6 2 | 0·93 |

Mr. Kelkar cut three different patches to make up his 8 gunthas.

The two experiments on niger-seed (Nos. 110 and 111) were done in Khoti villages. The cultivators pay one-third of the gross produce to the Khots. Both the experimenter and the Collector deplore the system. The Collector says that the experiments "show how necessary it is that the security of fixed rents be given to the occupancy tenants of the Khots. No improvements can be expected in their lands until this is done." Mr. Kelkar's experiments add to our knowledge of the cropping and capabilities of the *varkas* lands of the district. The first field belongs to two persons, one owning 3 acres 2 gunthas in which the plot selected for experiment was. Thirty-five gunthas are under niger-seed and 7 under *harik*, the rest presumably being grass with a few gunthas of *Pot Kharáb*. The other field has 6 gunthas *vari*, 7 *kulthi*, 34 niger-seed and 7 fallow. In both fields Mr. Kelkar cut 3 patches of niger-seed and he gives their outturns separately thus :—

| First Field. | | | Second Field. | | |
|---|---|---|---|---|---|
| | Grain. | | | Grain. | |
| | Sers. | Tolas. | | Sers. | Tolas. |
| 3 gunthas ... ... | $11\frac{3}{4}$ | 5 | 4 gunthás ... ... | $13\frac{3}{4}$ | ... |
| 3 do. ... ... | $9\frac{1}{2}$ | 3 | 2 do. ... ... | $5\frac{3}{4}$ | 2 |
| 2 do. ... ... | 6 | 8 | 2 do. ... ... | $6\frac{1}{4}$ | 7 |
| | $27\frac{1}{4}$ = $30\frac{1}{2}$ lbs. | 16 | | $25\frac{3}{4}$ = $28\frac{3}{8}$ lbs. | 9 |

The difference in yield of the various patches is considerable.

Both fields undergo four years' cropping and are then fallow for four years. The cropping of the first field is given thus:—

| | Part under Harik. | Part under Niger-seed. |
|---|---|---|
| 1892-93 ... ... | Fallow for the last four years. | |
| 1893-94 ... ... | Nágli ... | Nágli. |
| 1894-95 ... ... | Sarvat Bhát .. | Harik. |
| 1895-96 ... ... | Harik ... | Niger-seed. |
| 1896-97 ... ... | Niger-seed ... | Sarvat Bhát. |
| 1897-98 ... ... | Fallow for the next four years. | |

The whole of the second field was under *Sarvat* rice in 1894-95 and *nágli* in 1893-94, and the owner, a Mhár, said he would most likely sow *Sarvat* rice in the whole field next year. The two fields are thus contrasted:—

| | Anna Estimate. | Outturn of Seed per Acre. | Value of Outturn. | | | Assessment per Acre. | | | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|---|---|---|
| | As. | Lbs. | Rs. | a. | p. | Rs. | a. | p. | |
| Experiment No. 110 ... | 10 | 150 | 6 | 13 | 0 | 0 | 4 | 1 | 3·74 |
| Do. No. 111 ... | 10 | 141 | 6 | 7 | 0 | 0 | 3 | 8 | 3·56 |

The straw and chaff are useless and not priced. The seed is valued at 22 lbs. per rupee, which is a cheaper rate than that quoted by Mr. Chuckerbutty. The experimenter mentions that the crop was not weeded as the plant has tender stalks, and they are liable to be broken if the weeding is not very carefully done.

Mr. Kelkar's last experiment (No. 112) was on *harik* or *kodra* in a Khoti village where the tenant pays $\frac{1}{3}$ produce to the Khot. The whole of the Phálani number was sown with *harik*. Mr. Kelkar again cut three patches, and they again differed considerably in outturn. The field is cropped for 5 years and lies fallow for 3. Crops grown were, in order, *harik*, *vari*, niger-seed, *nágli* and *harik*. This year's crop is therefore the last of the series. The land is said to be well situated and almost level. It was cultivated with care though unmanured. Seed, at the rate of 25 lbs. per acre, was broad-casted in June. The seed-rate is high—$2\frac{1}{2}$ lbs. per acre; the anna estimate, 10, is low.

Outturn results are:—

| | Outturn of Grain per Acre. | Value of Outturn. | | | Assessment per Acre. | | | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|---|---|---|
| | Lbs. | Rs. | a. | p. | Rs. | a. | p. | |
| Experiment No. 112 ... ... | 736 | 7 | 5 | 9 | 0 | 6 | 8 | 5·66 |

The grain is priced at 100 lbs. per rupee, the straw not at all. The experimenter states that the cultivator immediately burnt the chaff to prevent cattle eating it as it is deleterious to them, and makes the following observation:—

"The grain is washed with cow-dung to eliminate its bad qualities and then ground with an earthen mill for food. If any person eats it without that, he, it is said, is attacked with shivering and vomits blood. It is the food of the poor."

Mr. Patvardhan in his Thána report makes similar statements.

## Ka'nara.

Mr. Divátia did 2 tests on rice and Mr. McNeill 3 on the same crop. Mr. Divátia could not carry out the third experiment owing to his being engaged in other emergent work.

*Mr. N. B. Divátia, Assistant Collector,*

Submits a test on rice sown broad-cast in the Kárvár táluka. The field is of a sandy dark-brown soil measuring 34 gunthas, and assessed at Rs. 3-8-0 or Rs. 4-1-10 per acre. It grows rice every year. The variety of rice is known as *Ajga*, and it is priced at rather over 60½ lbs. per rupee. The straw fetches 6 annas per hundred bundles, or about 10½ cwts. per rupee. The field was manured with cow-dung composted with leaves, 20 basketsful per acre. Season was fair but rain failed for a month after 15th August. Seed-rate is quoted at 17 lbs. 23 *tolas* per acre. This must be wrong and the experimenter thinks so. The usual rate is stated to be 1½ Khandis or 175 lbs. per acre. The formulæ rate is 120 lbs. Mr. Divátia states that transplanted rice is not grown in the village of Bád in which the experiment was taken.

The outturn, &c., results are :—

| | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | Principal Product. | By-Product. | | | |
| | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 113 ... ... | 3,013 | 4,462 | 54 4 0 | 4 1 10 | 7·58 |

The crop, which appears to be an excellent one, is classed at 16 annas. The outturn is said to have been greater last year. The cultivator is a tenant who pays 9 Khandis of paddy per annum as rent for the 34 gunthas—about Rs. 17 per acre. Of the soil the experimenter says : " The first layer nearly one inch thick is of dark-brown soil and below that it is sandy. Everywhere the soil is of the same sort and the admixture of sand makes the variations."

This officer also sends another test on rice in the same táluka. This field grows rice every year and is irrigated, when rain fails, from a neighbouring tank which has been improved and enlarged by the Khátedár of the field at a cost said to be Rs. 800. The seed was not sown in a seed-bed first, but broad-casted direct in the field. Seed-rate is 93½ lbs. per acre. Two varieties of rice grow in the field, Sarti and Motalgo ; 2 gunthas of each were cut. The season was fair, but rain held off for 6 weeks in September and October. The soil is a brownish clay and Mr. Divátia calls the cultivation indifferent, because he says insufficient weeding was done owing to scarcity of labourers. 120 baskets of manure per acre were applied.

Outturn, &c., results are ;—

| | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. |
|---|---|---|---|---|---|
| | Principal Product. | By-Product. | | | |
| | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Experiment No. 114 ... | 441 Motalgo. 250 Sarti. | 1,873 | 27 15 10 | 2 12 6 | 9·93 |

The yield appears very poor. Fodder is priced at 100 bundles for 8 annas or 3$\frac{3}{7}$ cwts. per rupee. Motalgo paddy at 31 lbs. and Sarti at 28$\frac{1}{5}$ lbs. per rupee. These rates are almost incredibly high, but Mr. Divátia in answer to a reference replies that they were ascertained " after due enquiry." He admits they " appear a little high." The by-product, too, here rated as 3½ cwts. is much dearer

than in the first test, where it was 10½ cwts. per rupee. Sarti rice supplies the seed for the late, *Vaingan*, rice crop. Mr. Divátia's remarks are almost unintelligible from the number of Kánarese words he uses. It is not, for instance, to be assumed that every one understands the meaning of such words as *Ut*, *Soppu* and *Kúmba*. If they are to be used, they should be explained.

Samples of grain for this last experiment weighed in this office about 2 *tolas* in excess of the recorded weight. This is quite the reverse of what is usual.

*Mr. J. McNeill, Assistant Collector,*

Sends three rice tests which are very carefully and fully reported.

The first experiment (No. 115) was taken on a portion of a number which at original settlement was classed partly as Rice land, partly as Pulan and partly as Jiráyat. The cultivator pays for the 3 acres of land now under rice Rs. 2-14-0 per acre, whilst the original Rice area 1 acre 23 gunthas was assessed at Rs. 4-12-2 per acre. The new Rice land cannot be distinguished from the old. Rice is grown every year, but no second crop is taken. The crop was grown from broad-casted seed sown in the third week of June. The seed is sown sometimes earlier, sometimes later, according to the rainfall. The soil must be worked into a sloppy condition before the seed is sown. The seed-rate, 135 lbs. per acre, is said to be much lower than for poorer and more sandy fields, which receive 50 to 60 per cent. more. The season was very good, but not so good as the previous year, which was excellent. The tillage was careful and the field was well manured with 24 cart-loads or 480 baskets to the acre of cow-dung composted with leaves, husks, ashes and miscellaneous rubbish. The field is very favourably situate. It receives the wash from forest-clad hills and the water carries to the field fine mould and decayed vegetable matter which no doubt acts as manure. The crop was ripe on the 25th October and yielded well, exceedingly well, for broad-casted rice.

Mr. McNeill's second experiment (No. 116), also on broad-casted rice, does not show such a satisfactory outturn. The cultivation is described as indifferent, but in what respects is not clear, as the field was ploughed once in December and five times in June at intervals of 2 to 3 days. In August the field was weeded by hand. The season was only fair owing to an untimely break followed by a heavy fall when the crop was about ripe. The heavy rain beat the grain out of the ears. The field has rich brown soil, assessed at Rs. 2-2-10 per acre. It grows rice every year. 250 baskets of manure were applied per acre. The manure consisted of a compost of dung, litter and leaves. Seed at the rate of 94⅓ lbs. per acre was sown at the end of June. The crop was ripe at the middle of December.

The third experiment (No. 117) by this officer is on *Vaingan* or hot weather irrigated rice. The number is 5 acres 33 gunthas, of which 5 acres 17 gunthas is classed as Rice. Generally sugarcane is grown in a portion of this and *Vaingan* rice over the greater portion. A larger portion, the experimenter thinks, would probably be cropped with sugarcane, if more labour were available. Mr. McNeill says: "No rice is grown in the rains owing to excess of water, a fact probably ignored when the land was classed." If there is too much water for rice, it cannot be very good for sugarcane; probably the sugarcane is really only grown in the driest portion of the number. The field was manured with a compost of cow-dung and forest litter, 100 to 150 head-loads being applied per acre. The soil itself is very rich. The level of the field is being raised by annual deposit of silt and mould, washed down from forest uplands. The crop was weedy, otherwise the tillage was good. About 64 lbs. of seed per acre was broad-casted late in November. The crop ripened at end of March. The seed-rate is much lower than that reported for *Vaingan* rice in former years. Mr. McNeill describes the cultivation thus :—

"The field is ploughed six or eight times at intervals of four or five days, the first ploughing being given before the end of the monsoon. During the whole time the field is kept in a sloppy condition, when the manure is ploughed in, the surface is made even with a plank drawn by bullocks, once lengthwise and once

across. During the night the inlets from the water channel are closed and nex day the seed is sown. During the next 7 or 8 days a little water may be allowe to flow over the field by day, but it is always stopped at night. When the seed lings are well up, *i.e.* in about 7 days, the field is flooded to a depth of 4 to 6 inche and the water is kept at this level until the heads of the plants have begun to fal over, *i.e.*, about 15 days before cutting."

The field is watered by a channel running by the side of the field. Th channel leads from a dam about half a mile away on a small river. Same channe serves fields both higher up and lower down, all the fields being owned by the sam person. This year the supply, owing to scant late rainfall, was slightly deficient

The results of Mr. McNeill's tests are tabulated below :—

| | Anna Estimate | Outturn per Acre. | | Value of Outturn. | Assessment per Acre. | Percentage Incidence of Assessment. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Principal Product. | By-Product. | | | | |
| | As. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | | |
| Experiment No. 115 ... ... | 18 | 3,210 | 5,487 | 63 0 7 | 2 14 0 | 4·56 | Broad-casted rice. |
| Do. No. 116 ... ... | 16 | 1,328 | 4,090 | 35 9 4 | 2 2 10 | 6·11 | Do. |
| Do. No. 117 ... ... | 16 | 1,124 | 4,070 (wet). | 30 3 2 | 5 5 2 | 17·62 | Vaingan rice. |

# TABULAR SUMMARIES.

*Summary of Crop Experiment Reports,*

O. S.=Original Survey;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **AHMADABAD.** | | Annas | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. L. Robertson, Assistant Collector.* | | | | | | | | | | |
| 1 | Dholka (Dholka) ... | Rice (Sutarsál), 4th November 1895. | 8 to 10 | 975 to 1,220 | 27 | 429 in husk. | 2,200 | 13 10 5 | 2 10 6 R. S. | 19·45 | 0 8 |
| 2 | Do. ( do. ) ... | Do. do. ... | 12 | 1,460 | 26 | 774 in husk. | 3,250 | 23 11 9 | 4 3 9 R. S. | 17·84 | 0 4 |
| | *Mr. P. J. Mead, Assistant Collector.* | | | | | | | | | | |
| 3 | Dholka (Dholka) ... | Sugarcane (Dholi Sherdi), 27th and 28th January 1896. | 12 | 2,810 | 30,476 sets. | 4,411 gol. | ... | 376 5 3 | 2 4 3 R. S. | 0·60 | 0 8 |
| | *Mr. Jethálál Varajbhái, District Deputy Collector.* | | | | | | | | | | |
| 4 | Dhandhuka (Sodhi) . | Wheat (red Kátha), 11th February 1896. | 8 | 450 | 51 | 138 | 164 | 4 11 6 | 1 12 6 R. S. | 37·74 | 0 10 |
| 5 | Do. ( do. )... | Do. (white), 12th February 1896. | 8 | 450 | 51 | 218 | 128 | 7 11 10 | 1 15 4 R. S. | 25·30 | 0 10 |
| 6 | Do. ( do. )... | Do. (do.) 13th February 1896. | 8 | 450 | 51 | 242 | 246 | 8 14 7 | 1 8 8 R. S. | 17·29 | 0 10 |
| | **KAIRA.** | | | | | | | | | | |
| | *Mr. W. Doderet, Assistant Collector.* | | | | | | | | | | |
| 7 | Nadiád (Kamla) ... | Cajanus indicus (Tuver), 12th February 1896. | 14 | 660 | 4½ | 549 | 130 bundles sticks, 390 chaff. | 17 2 0 | 4 12 9 R. S. | 28·01 | 0 8 |
| 8 | Do. (Kakarkhad Pati). | Do. 14th February 1896. | 16 | 750 | 4 | 772 | 1,040 sticks, 595 chaff. | 23 8 6 | 6 5 11 R. S. | 27·07 | 0 8 |
| | *Mr. B. E. Modi, District Deputy Collector.* | | | | | | | | | | |
| 9 | Mátar (Pipalia) ... | Spiked millet (Bájri), 29th September 1895. | 14 | 850 | 10 | 608 | 400 bundles straw, 77 chaff. | 22 12 3 | 4 12 5 R. S. | 20·98 | 0 8 |

*Northern Division, 1895-96.*

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 40 weight. | $36\frac{1}{2}$ | $10\frac{1}{2}$ | *Experiment No. 1.*—*Sutarsál* rice on ordinary black soil, converted into rice land 5 years ago. The field manured with 7 cart-loads per acre of ordinary manure and irrigated twice from a tank by means of a *jheel*. Season bad owing to deficient late rains; tillage good. $6\frac{2}{3}$ gunthas of seed-bed are stated to have furnished seedlings for an acre. Yield, compared to the formulæ, only 4 annas. |
| Do. | $36\frac{1}{2}$ | $11\frac{4}{7}$ | *Experiment No. 2.*—Same crop on *kyári* land manured with 4 carts per acre of cow-dung. Crop irrigated from a tank and also from a well. Seedlings from $6\frac{1}{3}$ gunthas covered an acre of plantation. Season, &c., as above. Outturn 6 annas according to the formulæ, though estimated at 12 annas. |
| Do. | $11\frac{3}{4}$ | ... | *Experiment No. 3.*—Sugarcane, *Dholi Sherdi*, on *Jiráyat gorádu* soil manured with 43 cart-loads per acre and top-dressed with about 730 lbs. of castor-seed refuse. Crop watered from a well, but the extent of irrigation not ascertained. Rotation :—(1) and (2) *juvár*, (3) *bájri*, (4) *til*, (5) *juvár* and *til*, (6) *til* and (7) sugarcane. Season and cultivation both fair. Seed-rate high. Yield 17 annas according to the formulæ. *Gol* priced very high. |
| Do. | $32\frac{4}{5}$ | 3 | *Experiment No. 4.*—Dry-crop wheat, red *katha*, on unmanured and unirrigated black soil, which is occasionally enriched by deposits from flood-water. Rotation :—(1) wheat, (2) *juvár*, wheat and cotton, and (3) cotton. Incidence high owing to very poor outturn, which represents only a 2-anna crop of the formulæ. Season very unfavourable and cultivation indifferent. |
| Do. | $29\frac{3}{4}$ | $2\frac{6}{7}$ | *Experiment No. 5.*—White dry-crop wheat on similar soil, growing cotton alternately with *juvár* or wheat. Other remarks same as above. |
| Do. | $29\frac{3}{4}$ | 3 | *Experiment No. 6.*— Do. Do. Do. |
| Do. | $38\frac{3}{5}$ | 78 bundles sticks, $2\frac{6}{7}$ chaff. | *Experiment No. 7.*—*Tuver*, a subordinate crop in a mixture with *kodra*, on unmanured good dry-crop *gorádu* land, growing during the past three years *juvár*, *bájri* and *bávto* mixed with pulses. Season unfavourable owing to scanty late rains, but apparently *tuver* throve at the expense of *kodra* the principal crop; cultivation good. Incidence on the subordinate crop alone. |
| Do. | $38\frac{3}{5}$ | 78 bundles sticks, $2\frac{6}{7}$ chaff. | *Experiment No. 8.*—Same crop on similar but more highly assessed land dressed with $3\frac{1}{2}$ cart-loads of cow-dung per acre. Rotation :—*Bájri*, *kodra* or barley with pulses and also tobacco. Season and tillage as above. Incidence on the subordinate crop alone. |
| Do. | $32\frac{4}{5}$ | 107 bundles. | *Experiment No. 9.*—*Bájri* mixed with *math* and *juvár* on *gorádu* soil lightly dressed with 6 cart-loads per acre of ordinary manure and growing (1) cotton and wheat, (2) sugarcane and (3) *bájri* and wheat during the last three years. Season favourable and tillage good. The outturn, exclusive of the subordinate mixtures which were not tested, 10 annas of the formulæ standard. |

*Summary of Crop Experiment Reports,*

O. S.=Original Survey;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **KAIRA**—*continued.* | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. B. B. Modi, District Deputy Collector.* | | | | | | | | | | |
| 10 | Mátar (Ratanpur) ... | Spiked millet (Bájri), 12th October 1895. | 10 | 610 | 11 | 174 | 185 bundles. | 7 0 9 | 4 12 9 R. S. | 68·07 | 0 8 |
| | **PANCH MAHA'LS.** | | | | | | | | | | |
| | *Mr. J. A. G. Wales, Assistant Collector.* | | | | | | | | | | |
| 11 | Godhra (Godhra) ... | Do. 30th October 1895. | 12 | 620 | 23 | 709 | 1,000 bundles straw, 228 chaff. | 42 11 10 | 1 2 1 O. S. | 2·65 | 0 10 |
| 12 | Do. (Isrodiya) ... | Do. 6th November 1895. | 8 | 410 | 51 | 199 | 364 bundles straw, 75 chaff. | 13 4 4 | 0 13 4 O. S. | 6·13 | 0 12 |
| 13 | Do. ( do. ) ... | Do. 6th November 1895. | 8 | 410 | 14½ | 464 | 632 bundles straw, 144 chaff. | 27 14 9 | 1 6 8 O. S. | 5·08 | 0 10 |
| 14 | Do. (Rámpura) ... | Wheat (Popatia), 17th March 1896. | 8 | 640 | 78 | 506 | 932 straw, 137 chaff. | 17 7 2 | 1 13 5 O. S. | 10·54 | 0 8 |
| | *Mr. Jivanlál Pránjivandás, District Deputy Collector.* | | | | | | | | | | |
| 15 | Dohad (Dohad) ... | Rapeseed (Sarsav), 24th February 1896. | 20 | 800 | 10 | 441 seed. | 1,046 | 23 5 6 | 0 15 9 R. S. | 4·21 | 0 10 |
| 16 | Do. ( do. ) ... | Red gram (Lál Chana), 24th February 1896. | 16 | 975 | 25 | 349 | 492 | 9 4 0 | 1 3 2 R. S. | 12·95 | 0 10 |
| 17 | Do. (Kharaj (small)). | Do. 25th February 1896. | 15 | 915 | 51 | 359 | 428 | 9 6 4 | 1 3 9 R. S. | 13·13 | 0 10 |
| 18 | Do. (Nagrála) ... | Do. do. | 11 | 670 | 48 | 333 | 256 | 8 8 3 | 1 9 11 R. S. | 19·02 | 0 8 |

*Northern Division, 1895-96*—continued.

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 40 weight. | 32⅛ | 107 bundles. | *Experiment No. 10.*—Same crop with the usual pulse mixtures grown continuously on similarly assessed land not manured for the past two years. Tillage good, but unseasonable rains delayed sowing, and the crop suffered owing to scant rainfall later. The outturn only 3 annas according to the formulæ. |
| Do. | 30 | 100 bundles straw, $\frac{3}{14}$ chaff. | *Experiment No. 11.*—*Bájri* mixed with *tuver* and *math* on *gorádu* land manured with 9 cart-loads per acre of cattle-dung and growing the same crops every year. Late rains deficient and test crop affected thereby; tillage good. Seed had to be sown a second time owing to the washing away of the first sown seed. By-products valued very high; hence figures in column 9 untrustworthy. Subordinate crops not tested in this and the following 2 tests. |
| Do. | 30 | 100 bundles straw, $\frac{3}{14}$ chaff. | *Experiment No. 12.*—Same crop mixed with *math* and *mug* on similar soil manured with 6⅔ carts per acre of cattle-dung and growing *bájri* and *banti* with the pulses without any fixed rotation. Rain sufficient, but tillage indifferent. Seed-rate very high. Outturn very poor and represents, exclusive of the pulse mixtures, only a 4-anna crop of the formulæ. |
| Do. | 30 | 100 bundles straw, $\frac{3}{14}$ chaff. | *Experiment No. 13.*—Same crop mixed with *math*, *brinjals* and chillies on similar land manured with 10½ loads of manure per acre. Rotation undefined, but the field grew during the last 3 years (1) *bávto* and sugarcane, (2) *bájri* and tobacco, and (3) *bájri* and *bávto*, the last two with the usual pulse mixtures. Season as above. Tillage good. Seed sown twice as in Exp. No. 11. Valuation doubtful for reasons given above. |
| Do. | 29 | ... | *Experiment No. 14.*—Irrigated wheat, *Popatia*, as second crop on stony black soil growing rice followed by a second crop assisted by well water. The field liberally treated, before sowing of the first crop, with 27 carts of farmyard manure per acre. Rains deficient; cultivation good. By-product not valued. Incidence of assessment low for a second crop. |
| Do. | 18¼ | 19 | *Experiment No. 15.*—Rapeseed as a second crop on light brown *gorádu* soil growing maize every year and occasionally rice followed by gram and rapeseed. 10 carts of cow-dung per acre used before sowing. Season and tillage both good. The outturn is perhaps overestimated at the maximum. Incidence on the second crop only. |
| Do. | 41 | 6 | *Experiment No. 16.*—Red gram on similar soil after maize which had received a light dressing of 8 carts of cow-dung per acre. The field grows maize every year followed by gram with or without rapeseed. Season below average and tillage indifferent. Seed-rate low. |
| Do. | 41 | 6 | *Experiment No. 17.*— Do. do. do. Gram follows maize every year. Seed-rate average. |
| Do. | Do. | Do. | *Experiment No. 18.*— Do. do do. |

*Summary of Crop Experiment Reports,*

O. S. = Original Survey;

| No. | District, Táluka, Village, and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | BROACH. | | | | | | | | | | |
| | *Mr. Pherozshá'h Postonji, District Deputy Collector.* | | | | | | | | | | |
| 19 | Ankleshvar (Katpore). | Rice (Sukhvel), 15th December 1895. | 20 | 2,000 | 90 | 3,445 in husk. | 4,700 bundles. | 126 5 0 | 7 10 1 O. S. | 6·04 | 0 8 |
| 20 | Do. (Chorási) ... | Do. (Jádu Sáliu), 3rd November 1895 | 10 | 940 | 55 | 1,670 in husk. | 3,935 | 46 0 6 | 10 3 0 O. S. | 13·88 | 0 8 |
| | | followed by | | | | | | | | | |
| 21 | Do. ( do. ) ... | Wheat (Hásia and Kátha) with Dolichos lablab | 10 | 610 | 60 | 410 | 490 | 27 4 9 | | | 0 8 |
| | | (Vál) .. | 6 | ... | 8 | 105 | 110 | | | | |
| 22 | Do. (Survádi) ... | Spiked millet (Bájri), 23rd November 1895. | 18 | 1,400 | 5 | 1,205 | 3,010 | 46 14 0 | 10 14 6 O. S. | 23·26 | 0 8 |
| 23 | Vágra (Vágra) ... | Sesamum (Tal), 5th February 1896. | 8 | 260 | 1 | 150 seed. | ... | 11 13 0 | 4 10 2 O. S. | 39·51 | 0 8 |
| | *Mr. Sorábshá'h Hormasji, District Deputy Collector.* | | | | | | | | | | |
| 24 | Broach (Borbhátha) . | Rice (Dudhni), 13th October 1895. | 4 | 280 | 75 | 246 in husk. | 779 | 7 10 0 | 13 11 5 O. S. | 179·84 | 0 8 |
| 25 | Do. ( do. )... | Spiked millet (Bájri), 13th October 1895. | 20 | 1,600 | 10¼ | 1,350 | 2,195 | 51 4 8 | 13 12 2 O. S. | 26·82 | 0 10 |
| 26 | Jambusar (Limaj) ... | Sesamum (Tal) 26th January 1896. | 8 | 300 | ¼ | 131 seed. | ... | 11 0 0 | 5 5 10 O. S. | 48·76 | 0 10 |

*Northern Division, 1895-96*—continued.

R. S. = Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwt. | |
| 38½ weight. | 30 | 400 bundles. | *Experiment No. 19.*—Continuous rice, *Sukhvel*, on good black soil richly dressed with 60 cart-loads per acre of cattle droppings and irrigated once a week from a neighbouring tank. 2½ gunthas of seed-bed, which was in the field itself and received no special treatment, sufficed for 19 gunthas of plantation. No second crop is ever grown. Season favourable and tillage excellent. Seed-rate rather high. Outturn nearly 1¾ times the formulæ maximum. Grain valued very high. |
| Do. | 39 | 10⅝ | *Experiment No. 20.*—Coarse rice, *Júdu Sáliu*, on similar but more highly assessed land which is watered by flood-water coming from high-lying lands in surrounding villages. The field manured with 19 cart-loads per acre of cattle droppings. Rice is followed by wheat if season favourable. Seed-bed, which was hired close to the village, was not manured. Tillage good, but season unfavourable and crop suffered for lack of moisture. Yield probably underestimated, being 17 annas according to formulæ. |
| Do. | 22⅓ | 6/7 | Wheat mixed with *vál* as a second crop on the same land. Season as above; tillage indifferent. Outturn poor. Prices high. |
| | 39 | 6/7 | |
| Do. | 27⅛ | 10⅝ | *Experiment No. 22.*—*Bajri* on unmanured light yellow *gorat* soil commanded by a large well and growing usually garden crops and dry crops only occasionally to give rest to the land. Test crop watered once in September owing to deficient rainfall; tillage good. Outturn full average. Incidence somewhat high, but rich garden crops grown on part of the field. |
| Do. | 13 | ... | *Experiment No. 23.*—*Tal* on unmanured good black soil growing the same crop or *juvár* alternately with cotton. Season more unfavourable than in the above tests and outturn only poor—4 annas according to the formulæ. Incidence high, but cotton will doubtless bear greater portion of the assessment. |
| 40 veight. | 46⅞ | 2 13/14 | *Experiment No. 24.*—Unmanured rice, *Dudhni*, on light *gorádu* alluvial soil growing rice followed by rabi crops of *juvár* or wheat in alternate years. Field manured in the previous year by folding sheep. Season very unfavourable owing to want of August and September rains, cultivation good. Outturn poor, being equal in value to only half the Government dues. |
| Do. | 28½ | 4⅞ | *Experiment No. 25.*—*Bajri* on similar soil liberally treated with 48 carts per acre of farmyard manure. Season and tillage as above, but crop apparently did not suffer much. Outturn, compared to the formulæ, 17 annas. |
| Do. | 12 | ... | *Experiment No. 26.*—*Tal* on light *gorádu* soil grown in rotation with cotton. Field manured for the previous cotton with 15 cart-loads of farmyard manure. Seed-rate low. Season and cultivation as above. Yield only 3 annas according to formulæ standard. |

*Summary of Crop Experiment Reports,*

O. S. =Original Survey ;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | THA'NA. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. R. A. L. Moore, Assistant Collector.* | | | | | | | | | | |
| 27 | Salsette (Kálve) ... *Mr. V. R. Patvardhan, District Deputy Collector.* | Rice (Dodka), 13th November 1895. | 16 | 1,600 | 46½ | 1,819 in husk. | 116 head-loads. | 42 0 11 | 5 4 2 O. S. | 12·50 | 0 10 |
| 28 | Máhim (Pálghar) ... | Do. (Halvi Patni), 6th November 1895. | 16 | 1,600 | 69 | 1,606 Do. | 1,910 | 38 12 0 | 3 7 0 O. S. | 8·87 | 0 4 |
| 29 | Do. ( do. ) ... | Do. (Halva Kolumbya), 6th November 1895. | 18 | 1,800 | 62 | 2,310 Do. | 3,500 | 70 2 6 | 3 11 8 O. S. | 5·31 | 0 4 |
| 30 | Do. ( do. ) ... | Paspalum scrobiculatum (Kodra), 6th November 1895. | 18 | 720 | 51 | 1,551 | 2,475 | 11 14 0 | 3 7 0 O. S. | 28·94 | 0 8 |

*Northern Division, 1895-96*—concluded.

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|
| | Principal Product. | By-Product. | |
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 39½ | 48⅗ | 25 head-loads. | *Experiment No. 27.*—Unmanured rice, *Dodka*, on high-lying black soil growing the same crop every year without a second crop. Seed-bed, the extent of which could not be ascertained, was manured with dry fish (*kuta*). Season favourable and tillage good. Outturn 18 annas according to the formulæ standard. No sample received as required by standing orders. |
| 54 | 44⅓ | 6⅐ | *Experiment No. 28.*—Continuous rice, *Halvi Patni*, on ordinary black *kharif* unmanured land. 7 gunthas of seed-bed, rábed with 6 cart-loads each of cow-dung and dried grass, supplied seedlings for an acre of plantation. Season and tillage both good. |
| 53 | 34⅛ | 8⅐ | *Experiment No. 29.*—Rice, *Halva Kolumbya*, on similar soil growing the same crop every year. 62 lbs. of seed, put on 3 gunthas of seed-bed rábed with 3 cart-loads of cow-dung and dried grass each, raised seedlings sufficient for an acre of field. Season and tillage as above. Outturn more than 300 lbs. over the maximum of the formulæ. |
| 56 | 137⅘ | 35⅓ | *Experiment No. 30.*—*Harik* or *kodra* on *murmát kharif* uneven soil said to be unsuitable for rice or any other better crop and growing *harik* continuously for three years and then lying fallow for about 8 to 10 years. Seed-rate very high. Outturn nearly double the maximum of the formulæ. Grain and straw valued very cheap. Incidence high. |

*Summary of Crop Experiment Reports,*

O. S. = Original Survey;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | **KHANDESH.** | | | | | | | | | | |
| | *Mr. K. R. Bomanji, Assistant Collector.* | | | | | | | | | | |
| 31 | Sindkheda (Akadse) | Wheat (Gore), 26th January 1896. | 8 | 200 | 77 | 342 | 766 | 11 2 5 | 2 11 1 R. S. | 24·14 | 0 15 |
| 32 | Do. ( do. ) .. | Do. do. ... | 8 | 200 | 70 | 356 | 923 | 12 0 6 | 2 14 1 R. S. | 23·93 | 0 10 |
| | *Mr. J. H. DuBoulay, Assistant Collector.* | | | | | | | | | | |
| 33 | Pimpalner (Badne) | Sesamum (Til), 31st October 1895. | 8 | 140 | 2 | 61 seed. | ... | 3 5 4 | 0 5 9 O. S. | 10·78 | 0 10 |
| 34 | Do. ( do. ) .. | Spiked millet (Bájri), 31st October 1895. | 6 | 100 | 5 | 302 | 800 | 7 8 0 | 0 7 1 O. S. | 5·90 | 0 8 |
| 35 | Do. ( do. ) ... | Do. do. ... | 4 | 60 | 6 | 318 | 800 | 7 8 7 | 0 6 9 O. S. | 5·59 | 0 8 |
| 36 | Sháháda (Sárangkhede). | Wheat (Gore), 23rd January 1896. | 4 to 5 | 70 to 90 | 79 | 329 | ... | 7 13 11 | 2 13 1 O. S. | 35·80 | 0 8 |
| 37 | Do. ( do. ) .. | Do. do. ... | 4 | 70 | 95 | 68 | ... | 1 7 9 | 2 12 8 O. S. | 188·07 | 0 8 |
| 38 | Do. (Dhurkhede) | Do. 24th February 1896. | 11 | 390 | 76 | 342 | ... | 10 3 0 | 2 5 7 O. S. | 23·05 | 0 10 |
| | *Mr. G. W. Hatch, Assistant Collector.* | | | | | | | | | | |
| 39 | Bhusával (Kandári) | Spiked millet (Bájri), 16th October 1895. | 8 | 160 | 4 | 259 | 1,600 | 9 5 4 | 1 12 1 R. S. | 18·80 | 0 10 |
| 40 | Do. ( do. ) ... | Sesamum (Pándhara Til), 16th October 1895. | 16 | 560 | 3 | 460 seed. | ... | 25 5 4 | 1 2 5 R. S. | 4·54 | 0 10 |

*Central Division, 1895-96.*

R. S. = Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwt. | |
| 146 | 40 | $2\frac{2}{3}$ | *Experiment No. 31.*—Dry-crop wheat, *Gore gahu*, on unmanured black but slightly sandy soil growing during the past 3 years (1) *bájri*, (2) cotton and (3) wheat and linseed. Season bad owing to lack of late rains; tillage fair. Seed-rate high. Outturn 11 annas according to the formulæ standard. |
| 146 | 40 | $2\frac{2}{3}$ | *Experiment No. 32.*—Same crop on similar land under the same rotation. Field manured with 19 cart-loads per acre of cattle droppings. Other conditions as above. Sample *ser* forwarded to this office weighed 5 *tolas* in excess of the reported weight. |
| 120 | $18\frac{1}{2}$ | ... | *Experiment No. 33.*—Sesamum on unmanured poor light *kankari* soil growing *bájri*, *til*, and occasionally cotton. Season bad for want of rain, and tillage indifferent. Outturn 5 annas of the formulæ. |
| 147 | $48\frac{1}{4}$ | $5\frac{5}{7}$ | *Experiment No. 34.*—*Bájri* on similar but slightly superior soil lightly dressed with $2\frac{1}{2}$ cart-loads of sheep-dung per acre. Rotation and season as above. Tillage good. Seed-rate low. Outturn represents an 11-anna crop. Grain valued rather cheap in this and the following tests. |
| 144 | $50\frac{2}{3}$ | $5\frac{5}{7}$ | *Experiment No. 35.*— Do. do. do. |
| $72\frac{1}{3}$ | $47\frac{1}{2}$ | ... | *Experiment No. 36.*—Dry-crop wheat, *Gore*, on good black soil manured with 17 cart-loads of cow-dung per acre and growing irregularly cotton and wheat in rotation. Season very unfavourable owing to absence of late rains, and tillage not very careful. Seed-rate high. Outturn 11 annas according to the formulæ standard. |
| $70\frac{1}{2}$ | $57\frac{4}{5}$ | ... | *Experiment No. 37.*—Same crop on similar but unmanured soil. Rotation, season, &c., as above. Yield very poor, realizing only half the Government assessment. |
| 71 | $38\frac{4}{5}$ | ... | *Experiment No. 38.*—Same crop on somewhat inferior *raichikan* unmanured soil. Other conditions as above. Field selected as representing an average crop of the táluka this year. |
| 70 | 43 | $4\frac{3}{7}$ | *Experiment No. 39.*—*Bájri* on unmanured poor light soil growing *jowári*, cotton and *bájri* in indefinite rotation. Season unfavourable owing to prolonged break in the middle of the monsoon; tillage indifferent. Seed-rate low. |
| 59 | $18\frac{1}{7}$ | ... | *Experiment No. 40.*—White sesamum on fair black soil dressed with $7\frac{1}{2}$ cart-loads per acre of cow-dung and growing cotton alternately with *til*, linseed or *jowári*. Crop apparently did not suffer much from the break noted above; tillage good. Outturn, compared to the formulæ, 14 annas. |

*Summary of Crop Experiment Reports,*

O. S. = Original Survey ;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **KHA'NDESH—** *continued.* | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. G. W. Hatch, Assistant Collector* —continued. | | | | | | | | | | |
| 41 | Jalgáon (Varangáon). | Wheat (Bansi), 30th January 1896. | 4 | 70 | 80 | 236 | 240 | 9 9 8 | 3 5 6 R. S. | 34·81 | 0 10 |
| | *Mr. F. B. Young, Superintendent, L. R. and Agriculture, C.D.* | | | | | | | | | | |
| 42 | Sávda (Faizpur) ... | Great millet (Jowári), 20th November 1895. | 18 | 1,260 | 6⅝ | 566 | 4,800 kadbi. 175 chaff. | 20 13 0 | 2 7 1 R. S. | 11·73 | 0 8 |
| 43 | Do. ( do. ) ... | Do. ( do. ). | 19 | 1,330 | 5⅝ | 591 | 3,500 kadbi. 175 chaff. | 20 10 0 | 2 5 6 R. S. | 11·36 | 0 8 |
| | **NA'SIK.** | | | | | | | | | | |
| | *Mr. R. B. Stewart, Assistant Collector.* | | | | | | | | | | |
| 44 | Málegaon (Sangmeshvar). | Spiked millet (Bájri). 26th October 1895. | 16 | 640 | 6 | 1,578 | 5,610 | 28 9 6 | 8 8 0 O. S. | 29·79 | 0 8 |
| 45 | Do. (Dábhádi) ... | Great millet (Jowári), 23rd January 1896. | 6 | 150 | 2½ | 118 | 1,200 | 5 12 6 | 1 1 5 O. S. | 18·82 | 0 8 |
| | *Mr. C. M. Thatte, District Deputy Collector.* | | | | | | | | | | |
| 46 | Násik (Nándur Bahulo). | Groundnut (Bhuimug), 11th December 1895. | 11 | 1,400 | 49½ | 1,456 in shell | 2,761 | 43 1 0 | 2 13 0 O. S. | 6·53 | 0 5 |
| 47 | Dindori (Dindori)... | Do. 11th January 1896. | 11 | 1,400 | 60 | 1,543 in shell | 2,976 | 45 2 2 | 3 8 6 R. S. | 7·82 | 0 5 |

*Central Division, 1895-96*—continued.

R. S. = Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 142 | 29⅛ | 1⅜ | *Experiment No. 41.*—Dry-crop wheat, *Bansi*, on unmanured rich black soil growing mostly wheat and cotton in years of favourable rainfall only. Field manured three years ago. Season unfavourable owing to lack of September-October rain; tillage fair. Seed-rate very high. Outturn 9 annas according to the formulæ. Incidence high, due to poor crop. Sample weighed 2½ *tolas* in excess of the reported weight. |
| 138 | 42½ | 6¼ kadbi. 2½ chaff. | *Experiment No. 42.*—Kharif *jowári* mixed with *udid* on unmanured good black soil growing, without any fixed rotation, cotton, *jowári*, wheat and *bájri* with pulse mixtures. Season fair; tillage somewhat indifferent. Outturn exclusive of the untested minor crop much overestimated, being only 11 annas of the formulæ standard. |
| 128 | 39⅜ | 6¼ kadbi. 2⅓ chaff. | *Experiment No. 43.*—Same crop with *mug* on similar soil under the same rotation. Field dressed this year with 8 or 9 cart-loads of cattle manure per acre. Tillage good. Other conditions as above. Sample forwarded to this office weighed 2 *tolas* short of the reported weight. |
| 152 | 62⅕ | 15 | *Experiment No. 44.*—*Bájri* on rich black soil manured with 3 cart-loads per acre of cattle manure and household refuse and growing *bájri* followed by gram or *methi* assisted by irrigation. Rainfall scanty at commencement, but the test crop regularly watered from a *bandhára*; tillage good. Seed-rate low. Outturn nearly double the maximum of the formulæ (800 lbs.). Grain valued very cheap. Incidence on the first crop alone. Sample of grain not received. |
| 132 | 54⅙ | 3 | *Experiment No. 45.*—Rabi *jowári* on unmanured ordinary black soil growing *jowári* and linseed in alternate years. Tillage good, but season very unfavourable owing to failure of late rains. Seed-rate low. Outturn poor. |
| 80 weight. | 41½ | 3 | *Experiment No. 46.*—Groundnut on black *Bágáyat* soil well manured with 40 carts per acre of ordinary manure and growing during the previous three years (1) onions, (2) groundnut and (3) *bájri*. Crop watered by well and *pat* water, but the extent of irrigation not ascertained. Season and tillage both good. The experimenter forwarded samples of kernels while the test was taken on unshelled product. |
| Do. | 41½ | 3⅓ | *Experiment No. 47.*—Same crop on similar soil liberally dressed with 50 carts per acre of ordinary manure and growing (1) onions, (2) groundnut and (3) wheat. Field irrigated by *pát* water only. Other remarks as above. |

*Summary of Crop Experiment Reports,*

O. S.=Original Survey;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **AHMADNAGAR** | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. Sorábji Padamji, Assistant Collector.* | | | | | | | | | | |
| 48 | Sangamner (Nimgáon Jáli). | Great millet (Jowári, Shálu), 5th February 1896. | 8 | 240 | 4⅘ | 471 | 375 bundles kadbi. 60 chaff. | 11 9 0 | 0 8 9 R. S. | 4·73 | 0 8 |
| 49 | Do. (Aurangpor) . | Do. 6th February 1896. | 8 | 240 | 6½ | 392 | 325 bundles kadbi. 67 chaff. | 9 13 6 | 0 14 10 R. S. | 9·42 | 0 8 |
| | *Mr. R. C. Brown, Assistant Collector.* | | | | | | | | | | |
| 50 | Párner (Párner) ... | Great millet (Jowári), with saffl ower (Kardai), 6th February 1896. | 8 | 200 | 6 | 338 3⅓ seed | 325 bundles. | 10 0 4 | 0 6 0 R. S. | 3·76 | 0 8 |
| 51 | Do. ( do. ) ... | Do. do. ... | 10 | 310 | 4 | 470 1½ seed. | 390 bundles. | 12 13 5 | 0 8 7 R. S. | 4·17 | 0 8 |
| 52 | Do. ( do. ) ... | Do. do. ... | 10 | 310 | 37 | 404 14¾ seed. | 350 bundles. | 11 12 4 | 0 4 6 R. S. | 2·43 | 0 8 |
| | *Mr. L. M. Deshpánde, District Deputy Collector.* | | | | | | | | | | |
| 53 | Nevása (Tákli bháo) | Great millet (Dagdi Jowári), 20th February 1896. | 12 | 650 | 8 | 1,193 | 3,250 kadbi. 220 chaff. | 22 6 3 | 0 14 3 R. S. | 3·97 | 0 8 |
| 54 | Do. (Bhokar) ... | Do. 21st February 1896. | 10 | 400 | 8 | 759 | 5,350 kadbi. 262 chaff. | 19 11 1 | 0 14 4 R. S. | 4·55 | 0 8 |
| 55 | Kopárgáon (Vári) ... | Do. (Kálbondi Jowári), 27th February 1896. | 8 | 260 | 5 | 409 | 1,754 kadbi. 200 chaff. | 14 4 5 | 0 13 0 R. S. | 5·69 | 0 8 |

*Central Division, 1895-96*—continued.

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 102 | $62\frac{7}{10}$ | 100 bundles. | *Experiment No. 48*—Late *jowári* with a sprinkling of *kardai* on *mál* land growing, without manure, *bájri* and *jowári* with the usual pulse mixtures in alternate years. Scarcely any rain fell after sowing, and safflower failed entirely; tillage good. Seed-rate low. Sample received in this office gave an excess of 4 *tolas*. Grain valued rather low. |
| 102 | $62\frac{7}{10}$ | 100 bundles. | *Experiment No. 49.*—Same crop on unmanured black *gavháli* land growing *bájri* followed by wheat and *jowári* and wheat in alternate years. Sample weighed $106\frac{1}{4}$ *tolas* in this office. Other remarks as above. Safflower yielded only the seed sown. |
| $109\frac{5}{8}$ | $50\frac{3}{5}$ jowári. 32 kardai. | 100 bundles. | *Experiment No. 50.*—Rabi *jowári* mixed with safflower on unmanured stony brownish soil growing *bájri* and *jowári* alternately. Season unfavourable owing to insufficient late rains; tillage good. Seed-rate rather low. Sample *ser* weighed in this office $106\frac{3}{4}$ *tolas* only. |
| $114\frac{1}{2}$ | $52\frac{11}{13}$ jowári. $32\frac{4}{5}$ kardai. | 100 bundles. | *Experiment No. 51.*—Do. do. do. do. Seed-rate only half the usual rate. Outturn 12 annas of the formulæ standard. Sample weighed $6\frac{1}{2}$ *tolas* short in this office. |
| $112\frac{1}{2}$ | 52 | 100 bundles. | *Experiment No. 52.*—Do. do. do. do. Seed-rate nearly four times the formulæ rate. Sample *ser* weighed in this office 105 *tolas* only. |
| $112\frac{1}{2}$ | 72 | $5\frac{1}{2}$ kadbi. $2\frac{6}{7}$ chaff. | *Experiment No. 53.*—Rabi *jowári, Dagdi,* on unmanured black *kali gavháli* soil growing wheat and *jowári* with the usual pulse and oil-seed mixtures. Late rains deficient but the crop apparently suffered little. Outturn 18 annas according to the formulæ standard. |
| $112\frac{3}{4}$ | 72 | 5 kadbi. $2\frac{6}{7}$ chaff. | *Experiment No. 54.*—Same crop on similarly assessed *kevta* soil growing without manure wheat, *bájri* and the usual mixtures. Season, &c., as above. Crop 13 annas according to the formulæ. |
| 114 | $70\frac{1}{6}$ | 2 kadbi. 4 chaff. | *Experiment No. 55.*—Rabi *jowári, Kálbondi,* on unmanured brown *mál* land growing *jowári* and *bájri* with mixtures. Late rains scanty; cultivation good. *Kadbi* valued high. |

*Summary of Crop Experiment Reports,*

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **AHMADNAGAR** —*continued.* | | Annas | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.* | | | | | | | | | | |
| 56 | Shevgáon (Shevgáon) | Great millet, (Dagdi Jowári), 21st February 1896. | 20 | 1,300 | 20½ | 3,595 | 5,600 kadbi. 400 chaff. | 86 3 0 | 1 4 5 R. S. | 1·48 | 0 4 |
| 57 | Akola (Aurangpur) | Wheat (Pivla) with safflower (Kardai) and common mustard (Mohari), 23rd January 1896. | 16 | 640 | 45 ⅔ | 504 21½ seed. 4 | 800 | 20 8 2 | 1 9 9 R. S. | 7·84 | 0 10 |
| | **POONA.** | | | | | | | | | | |
| | *Mr. H. W. J. Bagnell, Assistant Collector.* | | | | | | | | | | |
| 58 | Mával (Talegáon Dábháde). | Rice (Sál), 13th November 1895. | 12 | 1,500 | 90 | 1,266 in husk. | 3,360 | 24 13 1 | 3 11 3 R. S. | 14·92 | 0 4 |
| 59 | Mával ( do. ) ... | Eleusine coracana (Halvi Nágli), 13th November 1895. | 16 | 1,200 | 9 | 908 | 1,370 | 19 8 9 | 0 14 5 R. S. | 4·61 | 0 8 |
| 60 | Haveli (Bhámburde) | Spiked millet (Bájri), with great millet (Hundi Jowári), 30th October 1895. | 10 | 250 | 28 | 672 121 | 3,040 | 24 1 0 | 1 7 5 R. S. | 6·08 | 0 8 |
| | *Mr. E. Carmichael, Assistant Collector.* | | | | | | | | | | |
| 61 | Purandhar (Ambodi) | Spiked millet (Bájri), 6th November 1895. | 6 | 100 | 5 | 323 | 1,380 | 10 2 6 | 1 4 6 R. S. | 12·61 | 0 8 |
| 62 | Do. (Pur) ... | Eleusine coracana (Náchni), 15th November 1895. | 9 | 335 | 3 | 856 | 975 | 13 11 3 | 0 6 3 R. S. | 2·85 | 0 8 |

*Central Division, 1895-96*—continued.

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 114 | 52⅔ | 3 kadbi. 5⅙ chaff. | *Experiment No. 56.*—Rabi *jowári, Dagdi,* on friable blackish garden soil, locally known as *sanvat,* liberally dressed with 40 carts per acre of compost of cattle-dung ashes and refuse. Rotation undefined. Crop regularly watered from an old well built before settlement; tillage good. Seed-rate rather high. Outturn excellent, being nearly three times the formulæ dry-crop maximum. Sample *ser* received in this office weighed 5 *tolas* short of the recorded weight. |
| 117 wheat. 70 kardai. 100 mustard. | 29¼ wheat. 30½ kardai. 20½ mustard. | 3 | *Experiment No. 57.*—Unirrigated yellow wheat with safflower and mustard on good black soil growing *jowári, bájri* and variety of pulses in indefinite rotation. Part of the field lightly dressed with about 2 carts manure per acre. Season somewhat unfavourable; cultivation good. Outturn, compared to the formulæ, 13 annas. |
| 79 | 56⅔ | 12 | *Experiment No. 58.*—Inferior rice, *Sál,* on *pándhri bhurki* soil growing the same crop every year. Field manured once in four years. Proportionate area of seed-bed to acre of plantation not ascertained. Season and tillage good. Seed-rate high. Sample 6 *tolas* short of the recorded weight. By-product valued very cheap. |
| 88 | 49⅔ | 9⅕ | *Experiment No. 59.*—*Nágli* on light-coloured soil growing usually *nágli* and occasionally *til.* Seed-bed rábed with cow-dung and grass; quantities of materials used not recorded Season and tillage both good. Outturn 13 annas according to the formulæ standard. |
| 92 bájri. 94 jowári. | 37¾ bájri. 48⅕ jowári. | 7¼ | *Experiment No. 60.*—*Bájri* mixed with *jowári* on mixed black soil dressed with 26 carts per acre of cow-dung and growing apparently *bájri* and gram every year. Season and tillage fair. Seed-rate very high. Outturn represents about maximum of the formulæ. Quantity of manure said to have been applied of very doubtful accuracy. |
| 95 | 39 | 6¼ | *Experiment No. 61.*—*Bájri* on unmanured medium friable black soil growing *jowári,* wheat and *bájri*—the last followed by second crop only in years of ample rainfall. Season unfavourable and tillage indifferent. Seed-rate low. Crop 11 annas according to the formulæ. Sample *ser* gave a difference of 3½ *tolas.* |
| 89 | 64 | 28 | *Experiment No. 62.*—*Nachni* on stony black *mal* land lightly manured with 3 cart-loads per acre of ordinary manure and growing *sáva, nachni* and *jowári* during the past three years. Area of seed-bed, which was rábed, not ascertained. Season unfavourable at first, but later rains saved the crop. Tillage good. Seed-rate rather low. Crop represents a 13-anna formulæ outturn. Sample *ser* 5 *tolas* short of the recorded weight. |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **POONA**—*continued.* | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. E. Carmichael, Assistant Collector*—continued. | | | | | | | | | | |
| 63 | Sirur (Shikrápur) ... | Gram, 7th February 1896. | 10 | 190 | 30 | 635 | 350 | 18 2 8 | 4 6 2 R. S. | 24·14 | 0 8 |
| | **SHOLA'PUR.** | | | | | | | | | | |
| | *Mr. B. C. H. C. Kennedy, Assistant Collector.* | | | | | | | | | | |
| 64 | Bársi (Hingni) ... | Linseed (Javas), 30th January 1896. | 10 | 155 | 4 | 348 seed. | ... | 16 13 3 | 0 11 4 R. S. | 5·57 | 0 8 |
| 65 | Do. ( do. ) ... | Gram, 30th January 1896. | 8 | 130 | 30 | 387 | ... | 9 2 11 | 0 13 7 R. S. | 9·24 | 0 8 |
| 66 | Do. (Pángre) ... | Pigoon Pea (Tur), 15th February 1896. | 8 | 160 | 6½ | 760 | ... | 15 15 0 | 0 9 10 R. S. | 3·85 | 0 8 |
| | *Mr. G. Scott, District Deputy Collector.* | | | | | | | | | | |
| 67 | Pandharpur (Pandharpur). | Sesamum (Til), 12th November 1895. | 16 | 560 | 2¾ | 121 seed. | 282 | 6 10 8 | 0 3 8 R. S. | 3·44 | 0 8 |
| 68 | Málsiras (Tondle) ... | Gram, 17th January 1896. | 14 | 400 | 26 | 429 | ... | 11 13 0 | 0 7 3 R. S. | 3·83 | 0 8 |
| 69 | Do. (Málsiras)... | Linseed (Javas), 1st February 1896. | 11 | 195 | 21 | 210 seed. | ... | 11 10 8 | 0 11 6 R. S. | 6·16 | 0 8 |

*Central Division, 1895-96*—continued.

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| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 99 | 35½ | 10 | *Experiment No. 63.*—Gram as second crop on slightly reddish black soil. Test crop irrigated twice from a *kachha bandhára* at one month's interval. No manure applied this year, but 15 carts per acre of ordinary manure were put on in the previous year. The field grew *bájri*, groundnut and *jowári* during the past three years and no second crop. Season favourable and tillage good. Outturn full average according to the formulæ. Incidence on the second crop alone. |
| 124 | 20⅔ | ... | *Experiment No. 64.*—Linseed on unmanured blackish brown *morvand* soil growing *jowári* for the past three years. Season fair and cultivation ordinary. Seed-rate very low. Outturn 15 annas according to the formulæ. Sample, weighed in this office, gave an excess of 3 *tolas*. |
| 143 | 42⅙ | ... | *Experiment No. 65.*—Unirrigated and unmanured gram on similar soil growing the same crops as above. Season and tillage as above. Outturn represents a 12-anna crop of the formulæ. Sample weighed 6½ *tolas* in excess of the recorded weight. Hence figures doubtful. |
| 155 | 47⅔ | ... | *Experiment No. 66.*—*Tur* on similar soil growing without manure (1) *jowári*, (2) groundnut and (3) *tur*. Season as above; tillage fair. Seed-rate rather low. Crop yielded a 19-anna formulæ outturn. Sample weighed 159½ *tolas* in this office. |
| 118 | 18⅙ | 4 | *Experiment No. 67.*—Sesamum on unmanured brown *mál* soil growing *jowári* or *bájri* with pulses without regular rotation. Season average; tillage indifferent. Outturn poor, being only 7 annas of the formulæ standard. |
| 145½ | 37⅓ | ... | *Experiment No. 68.*—Gram on deep black *chikan* soil dressed with 8 cart-loads per acre of farmyard manure and growing *bájri* and rabi *jowári* with pulse mixtures. Season as above; tillage good. Outturn 15 annas of the formulæ. Sample *ser* 3 *tolas* short of the recorded weight. |
| 122 | 18¾ | ... | *Experiment No. 69.*—Linseed with safflower in rows (7 : 1) on unmanured black soil growing *bájri* and rabi *jowári* with pulses and oil-seeds. The test crop grown for the first time on the field. Season and tillage as above. Seed-rate high. Outturn, exclusive of safflower, which was not tested, represents a 12-anna crop of the formulæ. |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | **SA'TA'RA.** *Mr. W. C. Rand, Assistant Collector.* | | | | | | | | | | |
| 70 | Sátára (Rohát) ... | Wheat (Khapli), 11th February 1896. | 16 | 1,040 | 88 | 485 | ... | 19 5 6 | 4 8 0 R. S. | 23·26 | 0 4½ |
| 71 | Jávli (Medha) ... | Do. (Pota), 22nd February 1896. | 16 | 1,040 | 136 | 659 | ... | 20 7 7 | 2 12 1 R. S. | 13·45 | 0 4 |
| 72 | Do. ( do. ) ... | Do. do. ... | 18 | 1,170 | 156 | 934 | ... | 28 1 6 | 5 9 11 R. S. | 20·00 | 0 4 |
| | *Mr. J. M. Cursetji, District Deputy Collector.* | | | | | | | | | | |
| 73 | Khatáv (Vaduj) ... | Groundnut (Bhuimug), 16th January 1896. | 11 | 1,400 | 108 | 1,547 in shell | 242 | 72 5 2 | 2 14 4 R. S. | 4·00 | 0 10 |
| 74 | Khánápur (Yede)... | Gram. 5th February 1896. | 16 | 560 | 114 | 640 | 584 | 17 2 6 | 1 11 0 R. S. | 9·83 | 0 10 |
| 75 | Khatáv (Khatáv) ... | Great millet (Jowári Shalu), 5th March 1896. | 18 | 1,260 | 17 | 3,069 | 8,004 | 105 12 1 | 1 2 7 R. S. | 1·09 | 0 10 |

*Central Division, 1895-96*—concluded.

R. S. = Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 115 | 25 | ... | *Experiment No. 70.*—Spelt wheat, *Khapli*, as second crop after *sáva* on unmanured reddish soil which grew during the last 3 years (1) *shálu jowári*, (2) groundnut and (3) *shálu jowári*. Manure applied only once in 3 or 4 years. Crop irrigated 4 times from a *pát*. Season moderately favourable and tillage fairly good. Seed-rate high. Crop 10 annas according to the formulæ standard. Incidence on second crop alone. |
| 119½ | 32¼ | ... | *Experiment No. 71.*—Wheat, *Pota*, as second crop after rice on land growing rice followed usually by field pea. A portion of the field under wheat had been rábed for a seed-bed for rice. Soil retentive of moisture and crop watered only once. Seed-rate very high. Crop 12 annas of the formulæ. Incidence moderate being on second crop only. |
| 123½ | 33¼ | ... | *Experiment No. 72.*—Same crop on similar soil growing rice followed by wheat. The field low-lying and highly retentive of moisture. Over 6½ gunthas of the field, which grew wheat, 10 baskets of cow-dung were spread before the rice. Outturn represents a 15-anna crop of the formulæ. Other remarks as above. Sample *ser* weighed 2½ *tolas* short of the recorded weight. |
| 78 weight. | 24 | ⅓ | *Experiment No. 73.*—Groundnut on *Bágáyat Pándhri du máti* soil growing every year sugarcane, groundnut, millets, chillies, garlic, wheat, *ratálu*, &c. 500 sheep folded for 12 days on the field, which besides was dressed with 12 cart-loads of cow-dung and ashes. Crop watered 5 times from a well and also from a *dharan*. Season very bad; tillage fair. Seed-rate high. Figures in column 7 are for unshelled nuts; while the sample sent to this office was of kernels. |
| 117 | 39 | 7 | *Experiment No. 74.*—Gram on *Jiráyat* black soil manured every other year with 8 cart-loads per acre of ordinary manure and with sheep folding and growing *bájri*, wheat, *jowári*, gram and other pulses every year. Season unsatisfactory owing to heavy late rains; tillage good. Seed-rate extremely high. Outturn 18 annas of the formulæ. |
| 110 | 36⅔ | 3⅘ | *Experiment No. 75.*—Irrigated *jowári* on ordinary black soil enriched with 24 carts of fresh soil from another field and heavily folded with 1,000 sheep per acre for 6 nights. The field grows *jowári* and groundnut alternately. Crop watered from irrigational canal. Season unfavourable owing to late heavy rains. Tillage very good. Seed-rate very high. Outturn unusually high—more than double the maximum of the formulæ. Grain and *kadbi* both valued very high. Sample received in this office weighed 99 *tólas* only; hence outturn figures doubtful. |

*Summary of Crop Experiment Reports,*

O. S.=Original Survey ;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **BELGAUM.** | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. A. S. A. Westropp, Assistant Collector.* | | | | | | | | | | |
| 76 | Chikodi (Hukeri) ... | Great millet (Karsal Jowári) and Kidney bean (Matki), 28th November 1855. | 10 | 435 | 2½<br>¾ | 567<br>209 | ... | 23 13 7 | 0 15 0 R. S. | 3 93 | 0 8 |
| 77 | Do. ( do. ) ... | Spiked millet (Bájri), 28th November 1895. | 8 | 160 | 4 | 314 | ... | 9 4 4 | 0 9 1 R. S. | 6·12 | 0 4 |
| 78 | Belgaum (Sutgatti) . | Gram, 1st February 1896. | 11 | 230 | 16 | 357 | ... | 11 0 0 | 1 12 3 R. S. | 16·05 | 0 4 |
| | *Mr. N. C. Soman, District Deputy Collector.* | | | | | | | | | | |
| 79 | Athni (Savdi) ... | Great millet (Rabi Jowári), 29th January 1896. | 18 | 1,260 | 4 | 472 | 806 kadbi. 124 chaff. | 14 6 8 | 0 15 9 R. S. | 7·13 | 0 10 |
| 80 | Gokák (Sundoli) ... | Do. 15th February 1896. | 20 | 1,400 | 12 | 1,856 | 1,590 kadbi. 264 chaff. | 45 8 0 | 1 2 5 R. S. | 2·53 | 0 10 |
| 81 | Athni (Savdi) ... | Gram and safflower, 29th January 1896. | 20<br>16 | 700 | 34<br>2½ | 543<br>123 seed. | 264 | 16 14 4 | 1 1 5 R. S. | 6·44 | 0 10 |
| | *Mr. J. L. Lushington, Superintendent, L. R. and Agriculture, S. D.* | | | | | | | | | | |
| 82 | Sampgaon (Mugutkhán Hubli). | Wheat (Gode), 17th January 1896. | 8 | 200 | 42 | 489 | 537 straw. 310 chaff. | 16 8 5 | 2 9 0 R. S. | 15·50 | 0 8 |
| 83 | Do. (Nangundikopp). | Gram, 6th January 1896. | 8 | 140 | 31 | 172 | ... | 6 11 5 | 0 9 3 R. S. | 8·61 | 0 8 |
| 84 | Do. ( do. ) ... | Pigeon pea (Tur), 20th January 1896. | 16 | 640 | 7⅔ | 82 | 175 | 3 6 0 | 2 10 0 R. S. | 77·7 | 1 24 |

*Southern Division, 1895-96.*

R. S. = Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 85<br>90¾ | 52⅓<br>46½ | ... | *Experiment No. 76.*—Kharif *jowári* with pulses in every fourth row on reddish light friable stony soil lightly treated with 6 carts per acre of cow-dung and sweepings and growing *jowári* for 3 years followed by chillies in the fourth year. Season only fair owing to heavy rain during the flowering period; cultivation indifferent; seed-rate low. *Tur* being unripe not tested, but its value included in column 9. |
| 84⅜ | 49½ | ... | *Experiment No. 77.*—*Bájri* with *kulthi* in every fourth row on unmanured soil similar to the above but less stony, growing *jowári* and *bájri* alternately. Season and tillage as above. Crop 11 annas according to the formulæ. Subordinate crop was almost a failure. Test area below the prescribed minimum. |
| 84½ | 32½ | ... | *Experiment No. 78.*—Unirrigated gram with safflower on blackish friable unretentive soil lightly dressed with 2 carts per acre of cow-dung and growing *jowári* followed by wheat and gram in alternate years. Field brought under cultivation 6 years ago. Season good; cultivation fair. Seed-rate low. Crop 13 annas according to the formulæ standard. Safflower, which occupied about $\frac{1}{10}$ of the area, not tested, being unripe. As above test area only half the prescribed minimum. |
| 80⅓ | 49⅓ | 1¾ kadbi.<br>1¼ chaff. | *Experiment No. 79.*—Rabi *jowári* on unmanured soft black soil growing *jowári*, pulses, oil seeds and cotton in indefinite rotation. Field usually flooded by the Krishna but not this year. Late rains somewhat scanty; cultivation good. Outturn 11 annas only according to the formulæ. |
| 78 | 48 | 2½ kadbi.<br>1¾ chaff. | *Experiment No. 80.*—Rabi *jowári* with pulse mixtures on similar soil inundated by a river and manured with 20 carts per acre of cattle manure and household refuse and growing every year the same crop. Season and tillage both good. Seed-rate high. Outturn full maximum of the formulæ. Sample *ser* 2 *tolas* short. Subordinate pulses failed entirely. |
| 84<br>63 | 43<br>32⅓ | 4⅓ | *Experiment No. 81.*—Gram mixed with safflower in every sixth row on black soil under similar conditions growing *jowári* and gram with pulse mixtures and cotton in indefinite rotation. Seed-rate rather high. Sample *ser* of gram received in this office weighed 3 *tolas* in excess of the reported weight. Other conditions as in Exp. No. 79. Safflower, which ripened later, tested by a Circle Inspector. |
| 83 | 38⅓ | 2 | *Experiment No. 82.*—Dry-crop wheat on black but rather clayey stiff soil dressed with 5 carts per acre of cow-dung and sweepings and growing *jowári* alternately with wheat or cotton. Season very moderate and tillage fair. Crop 12 annas according to the formulæ. |
| 84 | 27 | ... | *Experiment No. 83.*—Unirrigated gram on brown soil with a stony surface, locally known as *hulkeri masári*, lightly manured with about 2 to 3 carts per acre of cow-dung and sweepings. Season unfavourable; tillage fairly good. Pulse valued very high. By-product not weighed but valued at 5 annas. |
| 83 | 45⅓ | 1⅕ | *Experiment No. 84.*—*Tur* subordinate to *jowári* on slightly clayey black soil manured with 3 cart-loads per acre of cow-dung and sweepings and growing the same crops year after year. Season and tillage both good. Seed-rate high. Percentage very high, because the test crop occupied only the eighth row in the mixture. |

*Summary of Crop Experiment Reports*,
O. S. = Original Survey;

| No. | District, Táluka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Acre. Seed. | Yield of Principal Product | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **BIJA'PUR.** | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p | Rs. a. p. | Per cent. | A. g. |
| | *Mr. G. D. Pánse, Assistant Collector.* | | | | | | | | | | |
| 85 | Bágalkot (Halur) ... | Great millet (Kharif Jowári), 14th November 1895. | 16 | 1,040 | $4\frac{1}{10}$ | 1,469 | 13,790 kadbi. 964 chaff | 41 9 4 | 0 10 11 R. S. | 1·64 | 0 8 |
| | *Mr. H. Page, Assistant Collector.* | | | | | | | | | | |
| 86 | Sindgi (Kalkeri) ... | Wheat, 28th January 1896. | 8 | 240 | $18\frac{2}{3}$ | 276 | 209 | 8 5 11 | 0 15 11 R. S. | 11·88 | 0 9 |
| 87 | Do. ( do ) ... | Linseed, 28th January 1896. | 12 | 250 | $5\frac{1}{2}$ | 294 seed | ... | 12 9 7 | 0 15 11 R. S. | 7·89 | 0 $9\frac{1}{3}$ |
| 88 | Do. (Sindgi) ... | Great millet (Late Jowári), 13th February 1896. | 8 | 240 | 8 | 362 | 1,090 | 8 12 7 | 1 1 3 R. S. | 12·27 | 0 8 |
| | *Mr. R. C. Artál, District Deputy Collector.* | | | | | | | | | | |
| 89 | Muddebihál (Hullur). | Spiked millet (Bájri), 26th November 1895. | 14 | 540 | 3 | 619 | 2,183 | 9 10 1 | 0 10 9 R. S. | 6·97 | 0 12 |
| 90 | Bágevádi (Bágevádi). | Wheat, 1st February 1896. | 10 to 12 | 375 600 | 31 | 379 | 450 | 9 4 6 | 1 0 10 R. S. | 11·33 | 0 12 |
| 91 | Bágevádi (Ukli) ... | Gram, 12th February 1896. | 13 to 15 | 415 to 520 | 39 | 597 | 437 | 15 10 0 | 0 15 4 R. S. | 6·13 | 0 $11\frac{1}{4}$ |
| 92 | Do. ( do. ) ... | Linseed (Javas), 12th February 1896. | 12 to 14 | 250 to 335 | $6\frac{1}{3}$ | 190 seed | 341 | 8 13 2 | 0 15 3 R. S. | 10·95 | 0 $11\frac{1}{4}$ |
| 93 | Do. ( do. ) ... | Great millet, (Jowári), 13th February 1896. | 10 to 12 | 400 to 650 | $3\frac{1}{2}$ | 389 | 1,405 | 8 14 11 | 1 0 4 R. S. | 11·42 | 0 $11\frac{1}{4}$ |

*Southern Division, 1895-96*—continued.

R. S. = Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 80 | 51¼ | 14<br>2 | *Experiment No. 85.*—Kharif *jowári* with *tur* in every ninth row on ordinary black *yeri* soil manured with about 4 carts per acre of cow-dung and rubbish and growing usually *jowári*, but occasionally cotton also. Season good and tillage excellent. Yield exclusive of the subordinate untested *tur* more than maximum of the formulæ. |
| 156 | 38 | 1½ | *Experiment No. 86.*—Dry-crop wheat with safflower after every eighth row on unmanured soft black soil growing *jowári*, cotton and wheat with pulses and oilseeds. Season fair; cultivation good. Seed-rate very low. Yield in column 7 exclusive of the subordinate crop, which was not tested. Sample weighed 2 *tolas* in excess of the recorded weight. |
| 180 | 23⅓ | ... | *Experiment No. 87.*—Linseed with safflower after every sixth row on another part of the above field manured with 6¼ cart-loads per acre of ordinary manure. Season good. Other remarks as above. |
| 156 | 64 | 3 1/7 | *Experiment No. 88.*—Late *jowári* on black soil not manured for the last 12 years and growing (1) cotton, (2) linseed and (3) cotton during the past 3 years. Season fair and cultivation good. Crop 10 annas of the formulæ. |
| 154 | 67 | 46¾ | *Experiment No. 89.*—*Bájri* mixed with *kulthi* in every sixth row on unmanured sandy loam. The field was manured 4 or 5 years ago. Rotation undefined. *Jowári* and *bájri* with pulses and seeds mostly grown. Season and cultivation both fair. Seed-rate low. Outturn represents a 16-anna crop according to the formulæ standard. Grain valued very cheap. Sample 4½ *tolas* short of the recorded weight. Subordinate crop in this and the following 4 tests not taken into account. |
| 151½ | 42¾ | 9⅗ | *Experiment No. 90.*—Unirrigated wheat with safflower mixed in every seventh row on light black soil which is never manured. Rotation:—(1) late *jowári*, (2) safflower and (3) wheat grown during the past 3 years. Seed-rate low. Want of sufficient moisture due to shortness of late rain adversely affected the yield and reduced outturn to only 10 annas. Tillage good. Grain valued very low. |
| 151½ | 38¾ | 16 | *Experiment No. 91.*—Unirrigated and unmanured gram with safflower in every eighth row on similar soil growing during the past 3 years (1) late *jowári*, linseed and hemp, (2) wheat and safflower and (3) *jowári* and linseed. Season and cultivation both good. Seed-rate rather high. Crop 17 annas according to the formulæ. |
| 122⅞ | 22 | 24⅓ | *Experiment No. 92.*—Linseed with safflower in every eighth row on similar soil. Rotation undefined. Season fair. Tillage as above. Seed-rate very low. Outturn middling, being only 11 annas of the formulæ standard. |
| 137¾ | 56½ | 4⅔ | *Experiment No. 93.*—Rabi *jowári* with linseed on similar soil. Rotation, &c., as above. Crop 10 annas. |

*Summary of Crop Experiment Reports,*

O. S. = Original Survey;

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **DHA'RWA'R.** | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | *Mr. F. G. Anderson, Assistant Collector.* | | | | | | | | | | |
| 94 | Karajgi (Hatti mattur). | Great millet, (Pattan Shetti Jowári). 1st December 1895. | 20 | 1,300 | 11 | 1,393 | 4,000 | 25 4 0 | 0 13 2 R. S. | 3·25 | 0 5 |
| 95 | Ránebennur (Kupelur). | Wheat, 2nd February 1896. | 11 to 14 | 390 to 670 | 30 | 391 | ... | 16 10 7 | 1 10 11 R. S. | 10·09 | 0 8½ |
| 96 | Hángal (Hángal) ... | Linseed, 10th March 1896. | 12 | 250 | 14 | 244 | ... | 11 0 0 | 2 9 2 R. S. | 23·39 | 0 5 |
| | *Mr. K. N. Bhángáonkar, District Deputy Collector.* | | | | | | | | | | |
| 97 | Gadag (Kadadi) ... | Wheat, 19th January 1896. | 12 | 500 | 23½ | 381 | 426 | 13 11 9 | 1 0 2 R. S. | 7·35 | 0 14 |
| 98 | Ron (Nidgundi) ... | Gram, 31st January 1896. | 8 | 140 | 20 | 162 | 58 chaff. 23 stalks. | 5 6 5 | 1 0 3 R. S. | 18·80 | 0 14 |
| | **KOLA'BA.** | | | | | | | | | | |
| | *Mr. R. E. Kánga, District Deputy Collector.* | | | | | | | | | | |
| 99 | Alibág (Veshvi) ... | Rice (Patan Bhát), 14th November 1895. | 14 | 1,675 | 117 | 3,045 in husk. | 2,462 | 58 15 6 | 7 10 3 R. S. | 12·95 | 0 8 |
| | *Mr. G. P. Thakár, District Deputy Collector.* | | | | | | | | | | |
| 100 | Mángáon (Vinchavli). | Gram, 8th March 1896. | 16 | 320 | 79 | 296 | ... | 10 0 0 | 0 10 1 O. S. | 6·30 | 0 8 |
| 101 | Do. (Mángáon). | Do. 9th March 1896. | 12 | 200 | 79 | 275 | 245 | 9 5 4 | 0 15 6 O. S. | 10·38 | 0 8 |
| | *Mr. E. H. Hearn, Deputy Supt., Konkan Revenue Survey.* | | | | | | | | | | |
| 102 | Roha (Poi) ... ... | Rice (Mudga), 15th November 1895. | 18 | 2,700 | ... | 2,062 in husk. | 2,300 straw. 150 chaff. | 36 4 2 | 6 12 2 O. S. | 18·64 | 0 4 |

*Southern Division, 1895-96*—continued.

R. S. = Revision Survey.

| Equivalent in Tolas of local measure per. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|
| | Principal Product. | By-Product. | |
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 146 | 60 | 17½ | *Experiment No. 94.*—Rabi *jowári* on brown soil lightly manured with 5 carts per acre of cattle-dung and refuse and growing cotton, wheat and *jowári* in irregular rotation. Season very favourable and tillage good. Crop full average. By-product abnormally cheap. Sample 3 *tolas* short of the reported weight. |
| 145 | 25⅓ | ... | *Experiment No. 95.*—Dry-crop wheat on medium black soil dressed with a small quantity of manure and growing cotton, *jowári* and wheat in indefinite rotation. Season not quite favourable owing to excessive late rains. Tillage as above. Grain valued rather high. |
| 136 | 22⅙ | ... | *Experiment No. 96.*—Linseed as second crop on second class rice land growing rice followed by second crop only in years of ample rainfall. Field manured as usual for the rice. Season only fair for want of sufficient late rains; tillage good. Incidence on the second crop alone. Sample *ser* weighed 2½ *tolas* in excess of the recorded weight. |
| 152 | 35 | 1⅓ | *Experiment No. 97.*—Dry-crop wheat with safflower in every seventh row on rich black soil lightly manured with 2¼ cart-loads per acre of ordinary manure and growing *jowári*, cotton and wheat. Season favourable for rabi crops and tillage good. Seed-rate very low. Outturn exclusive of the subordinate crop which was not tested. |
| 149 | 30½ | 8 | *Experiment No. 98.*—Unirrigated and unmanured gram with safflower as above on inferior black soil growing *jowári*, Italian millet, cotton, wheat and pulses in indefinite rotation. Tillage good. Low outturn due to deficient rainfall. |
| 55½ | 57 | 4 | *Experiment No. 99.*—Rice on black *chikat* soil growing without manure the same crop every year followed by *vál*. 6 gunthas of seed-bed rábed with 40 cart-loads of cow-dung and 4 of rice straw provided seedlings for 35 gunthas of field. Season and tillage both good. Seed-rate very high. Outturn more than maximum of the formulæ. Incidence on the first crop alone. |
| 77 | 29⅗ | ... | *Experiment No. 100.*—Gram on deep black *malkhandi rabi* land lightly manured with about 1½ cart-loads per acre of ordinary manure and growing the same crop every year. Season and tillage both good. Seed-rate very high. Sample *adholi* 3½ *tolas* in excess of the reported weight. |
| 76½ | 29⅗ | ... | *Experiment No. 101.*—Same crop on black *galvat* soil growing without manure the same crop every year. Tillage indifferent. Other remarks as above. |
| 60 | 61½ | 8 | *Experiment No. 102.*—Rice, *Mudga*, on unmanured brown clayey soil growing the same crop every year. Seed sown in a seed-bed rábed as usual, but its extent and the quantity of seed used not ascertained. Season and tillage as above. Crop 14 annas according to the formulæ. Grain valued very cheap. |

*Summary of Crop Experiment Reports,*

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | Per cent. | A. g. |
| | **KOLA'BA—** *continued.* *Mr. E. H. Hearn, Deputy Supt., Konkan Revenue Survey—* continued. | | | | | | | | | | |
| 103 | Roha (Shedsai) ... *Mr. W. D. Wilkins, Asst. Supt., Konkan Revenue Survey.* | Pigeon pea (Tur), 18th December 1895. | 16 | 480 | 6 | 320 | 280 | 10 4 0 | 0 4 0 O. S. | 2·44 | 0 10 |
| 104 | Mahád (Akale) .. *Mr. J. A. McIver, Assistant Superintendent, Konkan Revenue Survey.* | Rice (Tavsál Halva), 16th November 1895. | 16 | 2,400 | 29 | 1,075 in husk. | 950 | 23 3 0 | 5 3 5 O. S. | 22·49 | 0 4 |
| 105 | Máhád (Morgiri) ... | Rice (Divályia), 15th November 1895. | 15 | 2,220 | 30½ | 1,602 Do. | 592 bundles. | 37 6 9 | 2 15 1 O. S. | 7·86 | 0 5 |
| | **RATNA'GIRI.** *Mr. A. W. G. Chuckerbutty, Assistant Collector.* | | | | | | | | | | |
| 106 | Rájápur (Kondhe) ... | Nigor-seed, 9th November 1895. | 12 | 250 | 11 | 196 seed. | 208 | 11 5 3 | 0 5 11 O. S. | 3·26 | 0 8 |
| 107 | Do. ( do. ).. | Do. do. ... | 14 | 335 | 15 | 255 seed. | 280 | 14 1 11 | 0 4 0 O. S. | 1·77 | 0 5 |
| 108 | Do. ( do. ).. | Elusine coracana (Late Rági) and Panicum miliari (Vari), 8th November 1895. | 12 | 800 | 13½ | 747<br>83 | 692<br>27 | 21 5 1 | 0 5 10 O. S. | 1·71 | 0 6 |

*Southern Division, 1895-96*—continued.

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 78 | 32 | 10 | *Experiment No. 103.*—*Tur* on reddish soil on the top of a hill rábed with cow-dung and grass and growing (1) *nágli* or *vari*, (2) *tur* and (3) fallow for 2 or 3 years. Season and cultivation both good. Seed-rate low. Crop 13 annas. By-product valued very low. |
| 63½ | 54 | 2 4/7 | *Experiment No. 104.*—Continuous *Tavsál halva* rice on unmanured reddish brown soil. 2¾ gunthas of rábed seed-bed furnished seedlings for an acre of plantation. Season favourable and tillage good. Seed-rate very low. Crop only 11 annas according to the formulæ. Incidence rather high. Crop probably under average for the village and probably over-estimated at the average standard. |
| 62 | 51 | 2 6/7 | *Experiment No. 105.*—*Garva* rice, *Diválya*, on unmanured red gravelly soil growing rice every year, *Panvel* and *Diválya* rice alternately. Seed sown in a rábed seed-bed of 2½ gunthas which gave seedlings for 12½ gunthas of field. Late rains injured the crop. Tillage good. Straw valued high. Sample 2½ *tolas* short of the recorded weight. |
| 29 | 19 3/5 | 2 2/3 | *Experiment No. 106.*—Niger-seed on *bharad varkas* soil. Season and tillage good. Seed-rate high. |
| 30 3/8 | 19½ | 2½ | *Experiment No. 107.*—Same crop on similar soil. Other remarks as above. Test area below the prescribed minimum. |
| 38¾ | 43¾ | 3 | *Experiment No. 108.*—Late *rági* mixed with *vari* on sloping stony *bharad varkas* land growing (1) *rági*, (2) *harik*, (3) niger-seed and (4) *sáva* followed by fallow for 3 or 4 years. Seed sown on rábed bed, area of which not ascertained. Dried fish applied as manure at time of transplantation. Season and cultivation both good. Outturn good. By-product valued high. Test area below the prescribed minimum. |
| 31½ | 38¾ | ... | |

*Summary of Crop Experiment Reports,*

O. S.=Original Survey;

| No. | District, Tálaka, Village and Experimenter. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formula. | Average per Acre. Seed. | Yield of Principal Product. | Yield of By-Product. | Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **RATNA'GIRI—** *continued.* | | Annas | Lbs. | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p | Per cent. | A. g. |
| | *Mr. V. R. Kalkar, District Deputy Collector.* | | | | | | | | | | |
| 109 | Ratnágiri (Shirgáon) | Elusine coracana (Rági), 9th October 1895. | 14 | 1,080 | 8⅓ | 1,433 | 2,110 | 41 4 0 | 0 6 2 O. S. | 0·93 | 0 8 |
| 110 | Do. (Khánu)... | Niger-seed (Karala), 3rd November 1895. | 10 | 155 | 10½ | 150 seed. | ... | 6 13 0 | 0 4 1 O. S. | 3·74 | 0 8 |
| 111 | Do. (Math) ... | Do. 6th November 1895. | 10 | 155 | 7¾ | 141 Do. | ... | 6 7 0 | 0 3 8 O. S. | 3·56 | 0 8 |
| 112 | Do. (Devrukh). | Paspalum scrobiculatum (Kodra), 18th November 1895. | 10 | 250 | 25 | 736 | ... | 7 5 9 | 0 6 8 O. S. | 5·66 | 0 8 |
| | **KA'NARA** *Mr. N. B. Divátia, Assistant Collector.* | | | | | | | | | | |
| 113 | Kárvár (Búd) ... | Rice (Ajga), 14th October 1895. | 16 | 2,400 | 17½ | 3,013 in husk | 4,462 | 54 4 0 | 4 1 10 O. S. | 7·58 | 0 4 |
| 114 | Do. (Virge) ... | Do. (Motalgo and Sarti), 11th November 1895. | 12 | 1,500 | 93 | 441 Motalgo. 250 Sarti in husk | 1,873 | 27 15 10 | 2 12 6 O. S. | 9·93 | 0 4 |
| | *Mr. J. McNeill, Assistant Collector.* | | | | | | | | | | |
| 115 | Karvár (Búd) ... | Do. (Sanna Malgi), 25th October 1895. | 18 | 2,700 | 135 | 3,210 Do. | 5,430 straw. 57 chaff. | 63 0 7 | 2 14 0 O. S. | 4·56 | 0 4 |
| 116 | Sirsi (Devimane) ... | Do. (Vommadlu), 14th December 1895. | 16 | 1,600 | 94½ | 1,328 Do. | 4,000 straw. 90 chaff. | 35 0 4 | 2 2 10 O. S. | 6·11 | 0 4 |
| 117 | Kumta (Alkad) ... | Do. (Vaingan Hanaga), 31st March 1896. | 16 | ... | 64 | 1,124 Do. | 4,070 wet straw. | 30 3 2 | 5 5 2 O. S. | 17·62 | 0 4 |

*Southern Division 1895-96*—concluded.

R. S.=Revision Survey.

| Equivalent in Tolas of local measure Ser. | Prices of Produce per Rupee. Principal Product. | By-Product. | Remarks. |
|---|---|---|---|
| 13 | 14 | 15 | 16 |
| Tolas. | Lbs. | Cwts. | |
| 48 7/8 | 37 3/8 | 6 | *Experiment No. 109.*—*Rági* on *bharad varkas* land which is being converted into Kharif and grows *nágli*, *udid*, niger-seed and *harik* in rotation. 3¾ gunthas of seed-bed rábed as usual is said to have furnished seedlings for 21 gunthas of field at time of transplantation. Fish manure applied at time of transplantation. Season and cultivation both good. Outturn 18 annas of the formulæ. |
| 43 | 22 | ... | *Experiment No. 110.*—Niger-seed on *mál varkas* land growing (1) *nágli*, (2) *harik*, (3) niger-seed and (4) *sarvat* rice followed by fallow for 4 years. Season and tillage as above. Outturn poor, due apparently to the test crop being the last but one in rotation. |
| 43 | 22 | ... | *Experiment No. 111.*—The same crop on *varkas* land under similar conditions. |
| 48¾ | 100 | ... | *Experiment No 112.*—*Harik*, the last crop of the series, on similar unmanured soil growing (1) *harik*, (2) *vari*, (3) *kárhala*, (4) *nágli* and (5) *harik* after 3 years' rest. Season and tillage both as above. Seed-rate high. Crop 15 annas. |
| 63 | 60½ | 10½ | *Experiment No. 113.*—Rice, *Ajga*, grown continuously on sandy dark-brown soil lightly manured with 20 baskets per acre of compost of cow-dung and dead leaves. Season fair and tillage on the whole good. Seed-rate very low. Outturn double the maximum of the formulæ. Sample *ser* weighed 60¾ *tolas* in this office. |
| 56⅛ Motalgo. 50 Sarti. | 31 Motalgo. 28⅕ Sarti. | 3 5/7 | *Experiment No. 114.*—Continuous rice on brownish clayey soil manured with 120 baskets per acre of cow-dung. Field irrigated when rain falls from a nighbouring tank. Rain held off for 6 weeks in latter part of monsoon. Cultivation indifferent. Outturn poor. Sample *ser* weighed in this office about 2 *tolas* in excess of the reported weight. Both grain and straw valued very high. |
| 59⅛ | 57 | 7⅔ | *Experiment No. 115.*—Rice, *Sanna Malgi*, grown continuously on muddy rice land with sandy sub-soil manured with 24 carts per acre of compost of cow-dung, leaves, husks, ashes and rubbish. The field being at the foot of a forest-clad hill, much fine mould and decayed vegetable matter is carried into it along with rain water. Season and tillage good. Outturn more than double the formulæ standard. Sample *ser* weighed 2 *tolas* short of the recorded weight. |
| 184½ | 47⅓ | 4½ | *Experiment No. 116.*—Inferior rice, *Vommadlu*, on rich brown soil manured with about 20 carts per acre of compost of cow-dung, litter and leaves and growing the same crop every year. Crop irrigated from a small *nála* close by. Season fair. Tillage indifferent. Crop 14 annas according to the formulæ. |
| 124¼ | 42½ | 9½ | *Experiment No. 117.*—*Vaingan* or hot weather rice on good brown soil enriched by wash from surrounding forest hills and manured with 100 to 150 head-loads of cow-dung and forest litter and growing the same crop year after year, the land being unsuitable for monsoon rice. Crop irrigated from a channel in the neighbourhood, which ran short of water this year owing to deficient late rains. Season average and cultivation fairly good. Seed-rate low. |

# SPECIAL REPORT

ON

# CROP EXPERIMENTS

MADE IN THE

# SURAT DISTRICT.

BENGAL SECRETARIAT LIBRARY

No. $\frac{A}{1466}$ OF 1896.

FROM

E. C. OZANNE, ESQUIRE, I. C. S., M.R.A.C.,
Survey Commissioner, and Director,
Land Records and Agriculture, Bombay;

To

J. MONTEATH, ESQUIRE, I. C. S.,
Secretary to Government,
Revenue Department, Bombay.

*Poona, 19th May 1896.*

SIR,

I have the honour to submit with the following remarks a special report by Mr. C. N. Seddon, I. C. S., on Crop Experiments made in the Surat District by several officers.

2. The special effort which these papers disclose is greatly due to the comments made in my Crop Experiment Report for the year 1893-94, in reviewing which Government (G. R. No. 4723, dated 24th June 1895, Revenue Department) called attention to the necessity of collecting reliable data in the Surat and Broach Districts as to the incidence of the assessment under current rates, in view of the question then, as now, for decision, whether revision settlements should be introduced. I had given an opinion that the experiments then under review indicated a high pitch of assessment in comparison with that of revised districts in Gujarát, and were evidence that the present distribution of the revenue demand was not equal. I thought that even if a net reduction of the assessment in some tálukas were to result from the close scrutiny which a revision would necessitate, there was ground for holding that in the interests of the cultivators some redistribution was at least requisite.

3. It is true that after submitting the report referred to, enquiry made proved that some of the crop tests on which this opinion was based were grossly inaccurate, but there remained adequate reasons for the order passed that the Agricultural Department should make the incidence of the present assessment a matter of special study.

4. Later on, as Government Resolution No. 8061 of the 16th October last shows, Mr. Muir-Mackenzie asked for assistance, with the result that Mr. Seddon was transferred from Kaira to Surat. Mr. D'Souza, already an Assistant Collector in Surat, was in addition to his regular duties directed to carry out numerous crop tests under the orders of the Survey Commissioner. Mr. Mollison, Superintendent of Farms, and Mr. Mehta, also an Agricultural Diplomate, holding an appointment in the Survey Department, were directed to assist to the utmost. Some help was also given by Messrs. Fernandez, Fforde and Forbes of the Survey Department. Mr. Mehta made several rapid visits to different tálukas in October to select suitable fields for experiment.

Throughout the season the efforts were not relaxed, though it was found possible to entrust Messrs. Seddon and D'Souza with a revenue charge, the crop tests taking precedence of other duties.

5. All the officers concerned have made the utmost of their time and opportunities. The analysis of the numerous tests was so formidable in bulk that Government were pleased on my representation to allow Mr. Seddon to draw it up under my supervision, so that the report may reach Government while the settlement reports of the three tálukas, Bárdoli, Olpád, and Chorási, are under deliberation. These reports, except Chorási, have already been submitted as trial settlements to enable Government to decide whether to sanction a regular revision settlement.

6. The reports are confined to Surat. Mr. Muir-Mackenzie's proposition was to confine the work to the three tálukas named above, but as two officers instead of one were deputed to the work, it has extended throughout the district. I think that similar effort need not be repeated in Surat, but it is an important matter to decide whether it is not required for Broach.

7. If Government think that the results of the Surat experiments are sufficiently valuable to justify the deputation of an officer to Broach next season, I hope that Mr. Seddon will be selected. He has gained a great deal of knowledge and insight both into the agricultural practices of Surat and into the working of the Survey and Settlement Department. My own opinion is that the repetition of the special effort in Broach next year will be valuable, and will help to prevent too great detail in the Broach revision, but at the same time may bring to light errors made at original survey which might otherwise escape notice in the very partial operations which are at present proposed to be carried out in the Broach District, prior to revising the rates on the expiry of current leases.

8. I now make a few comments on Mr. Seddon's analysis.

BA'RDOLI

9. The revision proposals for this táluka have been submitted provisionally in order that modifications might be recommended if indicated as necessary by the results of the crop experiments.

10. All the tests were taken in villages which are proposed for the first group in Bárdoli and this is satisfactory; for if the rates for that group are suitable, I have no doubt as to those for the other groups. I have closely studied the analysis, and believe that no modification is needed in the Bárdoli proposals. The pitch of both dry crop rate and the rate for water in rice land appear perfectly right as far as the crop tests give indication relevant to the matter. It has been explained in the report on Bárdoli that the real incidence of the water rate in rice land is not so greatly altered as the comparative figures would at first sight appear to necessitate; that is, the old Rs. 10 rate is not in actual working higher than the proposed Rs. 6 rate; for at original survey there was no addition in classification for the facility of growing a second crop after rice. The proposed rate only makes a great difference in (1) tank irrigated rice land and (2) in rice land without moisture for a second crop. (See paragraph 32 of my Bárdoli Report.)

11. The season for *Kada* rice was decidedly bad all over Surat. It was also unfavourable to *vál* following rice. Mr. Seddon has pointed out anomalous cases where the cultivator did not make the best use of his land.

12. The rates at which land is sublet, as disclosed by enquiries made by Mr. Seddon, are very low, so low as to carry the conviction, either that he was misinformed or that there were exceptional circumstances not brought out. In Exp. Nos. 9 and 10 it would seem that the Kanbi is the real owner and that the interloping Girásia has not ventured to assert a claim for a high rental.

13. The Bárdoli proposals deal more with a re-distribution of assessment than an alteration of the pitch, and, as far as Mr. Seddon's experiments show, the re-distribution has been made on right lines. It must not be supposed that the elimination of the Natural Bágáyat classification has invariably lowered the assessment on the lands so classed, or that, on the other hand, the difference between land assessed as Natural Bágáyat at original settlement and as Dry Crop now, is so small as that indicated in the special fields tested by Mr. Seddon. Where the land is really of superior order soil, and has sweet water available at a short depth, the dry crop assessment with the subsoil water charge brings no reduction, and in some cases a small increase; but there are numerous villages where these conditions were not present and where the elimination of the old Bágáyat assessment will cause a very large reduction and a just one. No such case has been tested by Mr. Seddon.

14. All the experiments are interesting, and the information carefully recorded by Mr. Seddon will be useful as an addition to our knowledge of agricultural practices as well as to the elucidation of the incidence of the survey assessment.

15. There is one case on which inquiry will be made, *i.e.*, that of Exp. No. 21. The classification of the soil at 11½ annas is not authorized by the rules. This is the chief reason for what, making allowances for the circumstances noticed by Mr. Seddon, seems still a high assessment. Mr. Seddon thinks that the revision assessment on the field of Exp. No. 26 is too low, as was the old assessment. At original survey apparently a mistake was made in not charging a water rate. At revision the re-classification in Bárdoli did not include a re-classification of Dry Crop land and the field in question has been *confirmed*, the old classification being taken as correct with the addition of the charge for subsoil waters.

16. The parasite referred to in Exp. No. 24 does not attack plants other than those belonging to the Solanaceæ, that is, tobacco, potatoes, &c. The cultivator's allegation that it prevents his growing sugarcane is incorrect.

## CHORA'SI.

17. The revision proposals for Chorási were received by me before I had studied Mr. Seddon's analysis of crop experiments in that táluka. The Deputy Superintendent, supported by the Collector, does not contemplate any modification of maximum rates.

18. The experiments made in Chorási were fairly numerous and from a settlement point of view were well selected. The rich garden land on the north and east of Surat and the Bháta land across the river received most attention. But in the garden villages dry crops also were not neglected. South of Surat the land is more or less impregnated with salt, and the water is brackish, facts which are very important in settlement. Garden crops in this locality are very rare and very unimportant, save toddy palms which have naturally not been selected for experiment. Ten experiments were made on *juvár*, sesamum and cotton in the adjoining villages of Althán and Bhatár. In the extreme south of the táluka, which is much intersected by Sachin territory, rice becomes a crop of some importance. Tests were made in six villages by Mr. Mehta, who, however, unfortunately disregarded the standing orders as to the minimum area for test. In an ordinary case I should reject these experiments, but they are the only evidence available in the report as to rice and are included in the analysis for what they are worth.

19. Even the experiments on dry crops in Althán and Magob show the great difference which exists between the two tracts represented by these villages. At present rates even in a year favourable for *juvár* and cotton, the incidence of assessment is high in the salt impregnated black soil south of Surat, while in the light soil villages, of which Magob is a fair representative, the present rates seem decidedly low. To a certain extent this will be remedied in classification; for land has been classed as Natural Bágáyat at revision wherever superior order soil has been found in conjunction with easily available sweet water. Cotton seems to do as well in one tract as in the other, but its cultivation is far more extensive in the black soil. The tests on sesamum disclose a high incidence. There is no doubt that sesamum is a good fallow crop, but there is evidence that it pays better to grow continuous *juvár* with pulses.

20. Exp. Nos. 53 to 55 are interesting. In the first, *juvár* is a rotation crop; in the other two it is continuous, though probably now and then it gives place to cotton or sesamum. In Exp. No. 54 the continuous *juvár* with good manure yielded better than in No. 53, but in No. 55, where apparently neither rotation nor manuring is usual, the incidence is naturally very high.

21. The experiments in cotton are very interesting, because this crop is usually beyond the power of ordinary crop experimenters. The liability to boll-worm from the use of factory-ginned seed arises, no doubt, from the inevitable mixture of seed taken from fields previously infected with the worm, with seed from uninfected fields. The cultivator could apparently save himself in large measure by hand-ginning all his seed from clean bolls.

22. It would seem, from the comparison instituted by Mr. Seddon at the end of comments on Exp. No. 61, that there is little difference in the profit of growing cotton and *juvár*, and considerable strength is given to his comment in the Bárdoli analysis, that it is a mistake to suppose that in Surat at least

cotton is the rent-paying crop, save in the sense that it is the crop sold for the rent. The deduction may be drawn from these tests that the maximum rate in the tract represented by Althán should not, as now, be the same as that represented by Magob.

23. I am diffident about making deductions from Mr. Mehta's rice experiments (Nos. 64 to 69), but in no case does the incidence appear excessive, especially when it is considered that in some cases where the land certainly can and usually does grow the second crop, either the second crop has not been tested or has not been grown this year. Mr. Mehta's estimate of the cost of cultivation of rice land is certainly open to the criticism which Mr. Seddon has made.

24. Mr. Mollison and Mr. Seddon have thoroughly studied the high cultivation in garden land in Magob and Kumbhária, and shown how even Surat to a large extent supplies the Bombay market of the crops grown, groundnut, cabbages, potatoes, ginger, turmeric, yams, onions, sugarcane and sweet potatoes. The first three are crops of somewhat comparatively recent introduction. Sugarcane probably does not pay as it used to, though the experiments made indicate that it is still a most profitable crop.

25. The agricultural information incorporated in Mr. Seddon's analysis need not be referred to now, though I by no means underrate its value.

26. The table given at the end of the Chorási analysis shows that, even without alteration of the maximum rates, the assessment on *some classes* of land will be considerably modified partly in the direction of increase and partly in the direction of reduction. Reduction follows in such a case as that of Exp. No. 82, where the whole charge of a large well was placed on a small area at original survey, thus raising the assessment to Rs. 27 per acre. On this field, if the maximum rates are not altered, the assessment as Natural Bágáyat, which the land certainly is, will be less by more than half. Increase will result from the partial classification done wherever the Natural Bágáyat rules have been applied to land formerly classed as Jiráyat. I may explain that these rules simply allow a double charge of the ordinary subsoil water scale wherever the land is found to be of superior order and wherever, at the same time, perfectly sweet water is obtainable at a depth not above 30 feet.

27. This simple modification of the subsoil water rules, to meet the case of such exceptional lands, appears, from the experiments and otherwise, to have given very satisfactory and just results. I may incidentally state in this place that the application of the subsoil water classification, even outside Natural Bágáyat, has effected a re-distribution of assessment, which is clearly right in the Chorási táluka. Thus in the villages north and east of Surat the area assessed is considerable, while in the major portion to the south and west, no charge has been made, even though here and there at original survey wells were assessed.

28. A few comments may be added on particular experiments.

29. In Exp. No. 71 the fertilizing effect of water is probably due to the presence of nitrates rather than of iron. There is no doubt that in Gujarát, for reasons as yet unexplained, some wells contain a very valuable amount of nitrates even though at a distance from the village site or other source where nitrates may be presumed to have been formed. The Agricultural Chemist to the Government of India has tested the water of numerous wells in North Gujarát, and his attention will be drawn to those near Surat. In Katárgaon especially I have personally noticed that wells, to all appearance highly brackish, clearly contain salts, other than common salt, which are decidedly beneficial and not injurious to cultivation.

30. Exp. Nos. 72—74 are on Bháta land in Adájan, a representative village in the trans-Tápti portion of Chorási. In Bháta land the classification is special as also the maximum rate, and the value of the water is included in the ordinary classification. These lands were assessed very highly at original survey. Adjoining them are lands of alluvial formation not now classed as Bháta where the present classification rules of the survey do not appear to meet the conditions found with sufficient accuracy. A long correspondence has taken place on this point. The current lease in these villages does not expire for several years, and I have referred the correspondence to the Deputy Superinten-

dent, in order that he may go over the area concerned, with Mr. Mollison and perhaps Mr. Seddon, who will be the Assistant in charge of the táluka.

31. Some departure from the strict letter of the rule seems necessary. As instances, Exp. Nos. 73 and 74 may be quoted. Under the survey rules the soil has been classed as superior order, but no subsoil water assessment has been imposed, on the ground that the water is brackish. But the experiments show that sugarcane is actually grown with this water, and it is a question whether some charge for the water should not be made. It is not probable but possible that the brackishness is not altogether due to the presence of common salt, but of some other salt, in part at least. Mr. Mollison's remarks quoted by Mr. Seddon are to the point. Mr. Seddon has shown how it is impossible to deal with other crops than sugarcane in this area under the Crop Experiment Rules. The cropping is so various and the crop mixture so complicated that none but a resident could take an experiment on all the crops of a field.

32. The high incidence in Exp. No. 75 is not explained. The land is evidently first rate Natural Bágáyat and has been classed almost at the maximum at revision, and there is nothing to show that this valuation is in any way wrong. It must be remembered, however, that groundnut, as Mr. Seddon shows, is a most valuable preparatory crop, both because it is a leguminous plant and because the digging of the groundnuts is in itself equal in value to a considerable expenditure on tillage.

33. The large discrepancy between the estimates of the Formulæ and the facts elicited show that this garden cultivation near Surat was not understood by the framers of the Formulæ.

34. The experiments in Chorasi, showing the great variety of cropping and conditions in the neighbourhood of Surat, give ample proof of the wisdom of the selection of Surat as the site for the new experimental farm in preference to Ahmadabad. This reason, indeed, was prominently noticed when the location of the farm at Surat was recommended.

## OLPÁD.

35. The experiments made in Olpád were confined to four villages situated in the central zone of the táluka, where cotton and *juvár* are both successfully grown. This is not the most fertile portion of the táluka. At the same time it is decidedly more fertile than the western portion, where continuous wheat is the chief crop. The experiments are on cotton and *juvár*, the staples of the tract represented by the four villages.

36. One experiment (No. 88) in Ambheta was taken in land which is liable from its lie to retain water, which becomes stagnant, for an injuriously long time. In the settlement of Olpád, the question of water-logging is of some importance. Ambheta is outside the area which has been designated by the Deputy Superintendent as the area most liable to injury from water-logging. The experiment adds force to my suggestion in the settlement proposals that Mr. Fernandez' list requires revision. It also shows that temporary remission in land liable to be water-logged should be given for a term of years, even though perhaps in occasional years the injury is not conspicuous.

37. The Olpád proposals have been submitted to Government and the few experiments made do not in any way lead me to modify my recommendations, except *perhaps* on one point. A reference to Appendix Q of the Olpád proposals will show that in three of the four villages concerned, the revision assessment will differ by an inappreciable amount from the present assessment. But in Safetabad, with unaltered maximum rates, there will be an increase of 31 per cent. Safetabad is an uninhabited village. At original survey the distance from village scale was taken from the village or villages where the cultivators resided. At revision survey it is proposed to apply no scale at all. The application of the scale at original survey did not always, as in this case, cause a large decrease in the assessment, so that when the scale is removed the assessment as shown in Appendix Q at revision survey exhibits a considerable enhancement. The question, then, on which the Olpád proposals may *possibly* require some modification is whether, in such villages, the practice at original

survey, or that now proposed at revision, should be followed. I adhere to my proposal that no scale should be applied, for it is hardly possible to go into such minutiæ as to consider where the cultivator of each field resides; and, moreover, a field is liable to change hands, and the scale cannot be altered should the field go into the possession of an inhabitant of another village. The utmost that can be done is to give the Collector discretion, if he finds that land in such villages is drifting out of cultivation because the cultivator loses the benefit of the scale deduction, either to induce the cultivators to inhabit the village by providing a village site, or in extreme cases to allow individuals a remission equivalent to the scale deduction. The latter alternative will, however, seldom be a satisfactory one, and I think that uninhabited villages should be left without the scale, unless the cultivators concerned agree to live in the village itself. The formation both of hamlets and village sites in deserted villages, is undoubtedly worthy of encouragement.

38. The incidence of assessment in the Olpád experiments is not excessive. The margin of profit left is considerable and I would in this connection transcribe a paragraph from my Crop Experiment Report for 1892-93 :—

"In highly assessed land even a large percentage incidence may leave a full margin of profit to the cultivator. In Exp. Nos. 13 and 14 compared, the balance due to the cultivator in the highly assessed land was only less by Rs. 4 per acre than the balance in the lowly valued land, though the incidence in the former was nearly 26 per cent. and only 8 per cent. in the latter. Undoubtedly a second crop was possible in the former and not likely in the latter. The same comparison may be exemplified from the report by comparing Exp. Nos. 11 and 12 with Nos. 29 and 30. In both these sets the early and late crops were tested. In the former pair the assessment is high, in the latter low. The incidence is 14 per cent. in the former and only 9 per cent. in the latter. The cost of cultivation of the rice and wheat in each of the two fields could not have differed much, but the balance left to the occupant in the former was Rs. 59 per acre while in the latter it was only Rs. 24.

"I think that these remarks fully justify the large incidence noticeable and noticed by Mr. Mollison with sometimes unfavourable comment."

Details of experiments of 1892 93 referred to above :—

| No. | Táluka and Village. | Crop. | Total value of produce. | Assessment excluding Local Funds. | Incidence of assessment on the value of the gross produce. |
|---|---|---|---|---|---|
| | | | Rs. a. p. | Rs. a. p. | |
| 11<br>12 | Mátar (Mátarpura) ...<br>Do. ( do. ) ... | Rice (Kamod) followed by wheat (Kátha). | 48 15 7<br>18 15 4 | 9 9 2<br>O. S. | 14·09 |
| 13 | Do. (Kanera) ... | Rice (Kamod) ... | 39 10 11 | 3 5 4<br>O. S. | 8·40 |
| 14 | Do. (Pansoli) ... | Do. (Jirásál or Jhini) ... | 42 12 0 | 10 14 11<br>O. S. | 25·57 |
| 29<br>30 | Dohad (Jála) ...<br>Do. ( do. ) ... | Do. (Sutarsál) followed by wheat (Vájia). | 18 4 0<br>8 8 11 | 2 7 0<br>R. S. | 9·09 |

39. The high incidence in Exp. No. 88 has been shown to be due to injury from stagnant water. In Exp. No. 84 it may also be noted that the subordinate pulses, if they had been tested, would have reduced the incidence. On the whole, then, the experiments do not show an excessive maximum rate in that particular part of Olpád represented by them. One of the villages, Saroli, is not in the same group as the other villages. This is not because its characteristics are different, but because its position near Ránder is more favourable.

40. The last comment made by Mr. Seddon under Exp. No. 88 is true that the difference in the assessment between good and bad lands is insufficient. This defect has been remedied in the revision classification with respect to sandy and salt lands. As regards water-logged lands also recommendations for remedy have been made. Except in these special cases there is no reason to think that the survey classification was or is at fault.

## CHIKHLI.

41. Of the remaining tálukas Chikhli is the only one of which I have any personal knowledge. The conditions of Chikhli are peculiar. It is an excellent rice-growing táluka and in places where water is available, either from wells or *dhekudis*, garden cultivation is very remunerative. There are, especially in the north-west, tracts where dry crop is productive and where cotton even grows with success. But the greater part of the dry crop land of Chikhli is either, as Mr. Mehta explains, shallow soil full of stones and lime nodules, or else so stiff a clay that dry crop cultivation is exceedingly unprofitable. Even grass grows very poorly. But such land when converted into rice, yields well. At the original survey this unproductive characteristic of the clayey soils of Chikhli was recognized. The Gujarát survey rules do not allow a fault for stiffness in clayey soil, because such a preponderating proportion of clay is excessively rare in that province. Therefore it became incumbent to recognize the non-productiveness of such soil in the maximum rates.

42. In Chikhli the dry crop maximum was pitched at a much lower figure than the soil rate for rice land. This treatment was exceptional and as far as I know was not needed elsewhere. It was an excellent way of disposing of the difficulty in Chikhli and will no doubt be imitated at revision.

43. In conducting the partial re-classification of Chikhli, considerable doubt has been thrown by chance tests made in dry crop as to the correctness of the old classification in such land. The general fault seems to be that the standard was pitched too high, but so far the evidence does not prove that it was irregular, and I doubt if any wholesale re-classification of the dry crop soils of Chikhli can be shown to be necessary or desirable.

44. The dry crop experiments were made in that part of the táluka where dry crops are more successful as shown by Mr. Mehta; but to compare the incidence with the figures of Olpád, the caution given in my remarks on that táluka as regards the comparative burden of assessment, as indicated by the incidence, in highly and lowly assessed land, must not be neglected.

45. The rice experiments disclose a moderate assessment. They were made on rice grown with the assistance of tank water, except in Exp. No. 122. The remark made as to Exp. No. 120, that the seed-bed was manured with Bombay hemp seed, appears doubtful. This plant is largely used as a green manure, but I have never heard of the seed being used directly as manure. The tanks in Ránkuva and Surkhái (Exp. Nos. 118 and 120) are exceedingly good; but *lang* is grown in the Ránkuva field near the tank because the moisture there is excessive for *vál*. I personally examined the site of this experiment.

46. Three experiments were made in this táluka on sugarcane. The fields selected were evidently of exceedingly fertile description. I saw the field at Pipalgabhán (Exp. No. 128). It has soil eminently suitable for garden cultivation, but irrigation is not available from wells or, at all events, there is no evidence that it is. Under the present rules, it cannot therefore be classed as Natural Bágáyat, but the soil will be classed as superior order soil and a *dhekudiát* charge superadded.

47. In this táluka the classification was not sufficiently advanced to enable Mr. Seddon to show how far the revision classification will modify that made at original survey Mr. Seddon has made several comments as regards the grouping of the villages. On this point I must enter a caution, that the grouping of Chikhli is very defective.

48. It is noteworthy that in this táluka there is clear evidence that ráb is a common practice in the preparation of the seed-bed for rice. In enquiries made some years ago by me on the question of ráb, the river Pár south of Chikhli was taken as the northern limit of ráb; but the ráb cultivation in Chikhli seems inferior, because it is more than once remarked that the seed-bed was extremely foul. This is never the case where ráb is thoroughly understood.

49. The Pipalgabhán experiment raises the question of *dhekudiat* assessment. The standing orders regarding this assessment only apply to the northern tálukas of Gujarát, and I have recorded in my settlement report on Bárdoli a strong opinion that the conditions of Surat are wholly different from those of

Ahmadabad and Kaira, in that the streams of Çhikhli and like tálukas, where *dhekudis* are common, have firm banks which are not liable to change, so that the main objection to *dhekudiát*, which caused its abolition in North Gujarát, does not in any way apply to Surat.

50. As to the tálukas of Jalálpor, Balsár and Párdi, I refrain from making any comment, because I do not know the tálukas personally, though I have visited Párdi, and because I think that the comments would be better made concurrently with the settlement reports when they are submitted, especially as by that time the effect of the revision classification will be known.

51. Mr. Seddon adds a table showing the details of the experiments made in each táluka on each crop. This is valuable if read with the comments in the tabular statement.

52. In his forwarding report Mr. Seddon comments on the inaccuracy of the Formulæ which were prepared for Surat. I think it is clear that the framers of the Formulæ were very insufficiently informed, especially as regards the high cultivation in the neighbourhood of Surat.

53. Mr. Seddon's analysis is a paper of considerable value. He was placed for 6 weeks on special duty for making this analysis and also the analysis of crop experiments outside Surat, as far as they were received up to the date of his return to his ordinary duties. He has manifestly gained a very clear insight not only into the agricultural practices of the Surat District, but also into the technical details of survey and settlement operations. This latter knowledge is possessed by few Civilians under present conditions. Mr. Seddon has shown great energy and discrimination in the conduct of the crop experiments in Surat last season and his analysis is a most creditable piece of work.

I have the honour to be,
Sir,
Your most obedient Servant,

E. C. OZANNE,
Survey Commissioner and Director,
Land Records and Agriculture, Bombay.

FROM

C. N. SEDDON, ESQUIRE, I. C. S.,
Assistant Collector on Special Duty ;

To

E. C. OZANNE, ESQUIRE, I.C.S., M.R.A.C.,
Survey Commissioner, and Director,
Land Records and Agriculture.

*Mahabaleshvar, 14th May 1896.*

SIR,

I have the honour to submit a report embodying an analysis of the series of crop experiments carried out in the Surat District during the past agricultural year.

The number of experiments made was 149 and I have added to the tabular statement all the experiments made in former years in the district.

2. Of the total number of experiments made this year, Messrs. Wood, Fernandez, Fforde, Forbes and Pránlál Harkisandás did between them 15, and the rest were carried out by Messrs. D'Souza, Mehta, Mollison and myself. The táluka of Chorási received most attention, 33 tests being taken in it. Of the other tálukas Bárdoli had 29, Jalálpor 21, Olpád 11, Balsár 18, Chikhli 17 and Párdi 20. Is was not found necessary or indeed possible to get any work done in Mándvi.

3. I have commented in the analysis itself at length on the various points as they arise in experiments. I shall confine myself here to a few observations which are either of general application or have not been sufficiently emphasised amongst a mass of other matter.

(*a*) The great variety of the crops grown in the district is worth noting. Surat is, broadly speaking, divided into two parts. In the north, comprising the tálukas of Olpád, Chorási, Mándvi, Bárdoli and Jalálpor, by far the largest area is under dry crop cultivation, principally *juvári* and cotton. In the south, Chikhli, Balsár and Párdi, rice cultivation takes the place of dry crops. In the north the most important question for decision is the proper rates leviable from dry crop lands. In the south the maximum rate for rice is the most important point for consideration. Garden cultivation extends throughout the district, and of all garden crops the most important is sugarcane.

The present experiments indicate that the assessment on dry crops in the north now taken is usually one-fifth of the produce. This seems large, but in the first place the cultivation of dry crops in Surat is neither expensive nor risky; rain seldom fails. And in the second, Gujarát has always paid a high percentage as assessment, and the objections which might apply to introducing high rates do not apply to retaining them. As for sugarcane and other graden crops, my opinion is that the present rates are by no means heavy. Malbári cane produces from 8,000 to 9,000 lbs. of *gol* and the produce is generally worth, even now when *gol* is so much cheaper, over Rs. 400 per acre. Near Surat there is an excellent market for all sorts of vegetables. Quantities are also sent to Bombay, and the present garden rates for the villages south of Surat are, I think, low.

The modifications that the revision survey will introduce into the assessment of rice lands will be very beneficial, particularly where the original survey wrongly classed rice land as Natural Bágáyat.

(*b*) The inferiority of Olpád to Chorási is well marked. I think there can be no doubt about it, if we except the strip of land on the east of the Olpád táluka. Maximum rates should not be the same in the two tálukas. It is Mr. Mollison's opinion that the natural fertility of black soil lands in Olpád is decreasing, and I fear that this is probably true. Lack of manure is the bane of dry crop cultivation.

(*c*) Inquiries made disclose a very low general rate of rent. I should, however, feel very loth to base any decided opinions on the facts recorded. In the first place, we have insufficient data, and a certain percentage of the facts stated may be false. It is the evidence of interested persons, cross-examined severely no doubt, but still not absolutely above suspicion. In the second place, the rent charged is no doubt often customary rather than economic. This, the proved value of the crop, occasionally makes quite clear. In the third place, there is a considerable amount of available evidence on the other side. I may instance the high rents paid for grass lands near Surat and the difficulty that has been experienced in obtaining land for the new Government farm. The returns embodied in the various revision survey proposals may also be noted, though confidence is by no means inspired in their accuracy.

4. In my report I have treated at greater length the four northern tálukas. This is partly because the experiments there are more numerous and varied and partly because I know these tálukas fairly well myself. Chikhli, Balsár and Párdi I have never visited, and my knowledge of them is entirely paper knowledge, if I may use the expression.

5. I have embodied in the report a considerable amount of agricultural information and have included descriptions of the practical cultivation of rice, *juvár*, cotton, sesamum, sugarcane, yams, sweet potatoes, &c. These descriptions are, I know, useless from the purely settlement point of view. At the same time if they are not given in this report they will not be given at all, and the information which Mr. Mollison, Mr. Mehta and myself have after considerable study and inquiry collected will be lost. I venture to think that many of these descriptions are interesting if nothing more.

6 The report contains a great mass of figures and calculations. Every care has been taken to secure accuracy, and I hope that there are no errors of any magnitude. In the experiments the greatest care was taken to make the returns of outturn absolutely trustworthy. I may add that I am responsible for all the opinions and facts given in the footnotes.

7. Before concluding I should like to add that the experiments have demonstrated that the formulæ rates of seed and outturn for Surat are in many cases incorrect. Actual rates for seed and outturn have been given for some important crops in Appendix A. The figures there given are collected from all the experiments done in Surat.

I have the honour to be,
Sir,
Your most obedient Servant,
C. N. SEDDON,
Assistant Collector on Special Duty.

## Analysis of Crop Experiments in the Surat District.

In all 149 experiments were during the year carried out in this district. Of these 27 were on *juvár*, 17 on cotton, 38 on rice, 24 on second crops following rice, 18 on sugarcane, 16 on other garden crops and the rest (6) on miscellaneous crops. Fifty-seven tests were done by myself. To the rest Mr. D'Souza contributed 24, Mr. Mollison 25, Mr. Mehta 28, Mr. Wood 3, Mr. Pránlál 7, Mr. Fernandez 2, Mr. Fforde 2 and Mr. Forbes 1.

I now proceed to analyse the experiments in order, táluka by táluka. Tests taken in previous years (since 1883-84), which have been added to the tabular statement for ready reference, are printed in italics by way of distinction.

### BA'RDOLI TA'LUKA.

Twenty-nine experiments were during the season taken by myself—9 on rice, 6 on second crops following rice, 4 on cotton, 3 on *juvár* with subsidiary pulses, and 7 on garden crops. The results are tabulated, and I proceed to deal with the experiments in order.

*Experiment No. 1.*—This was taken at Goji. Subsidiary to *juva'r* (Sorghum vulgare) were *vál* (Dolichos lablab), *tuver* (Cajanus Indicus), *choli* (Dolichos catiang) and *mag* (Phaseolus mungo). The *choli* and *mag* were trifling and not tested. *Vál* yielded fairly; *tuver*, though tested, was not worth it. The chief crop, *juva'r*, yielded 870 lbs. grain per acre and the total value of the acre outturn was Rs. 23-9-1. The land was assessed at the rate of Rs. 3-0-6 per acre and the incidence works out to 12·89 per cent., which is low. The seed rates quoted were 15 lbs. *juvár*, 3½ lbs. *vál*, 1 lb. *tuver*, 1 lb. *choli* and ¼ lb. *mag* per acre. The amount of *juvár* sown is undoubtedly exaggerated. Like all *juvár* in this district it was sown with a two-coultered drill (known locally as *phadko*) in July, the ground afterwards being smoothed with a *karab*. The cultivator is a Káliparaj man, a Dubla. The soil is light greyish brown with a considerable admixture of *kankar*; this field once formed the site of a Dubla settlement, and is supposed therefore to be somewhat above the average in fertility. Thirty cart-loads per acre of farm-yard manure are said to have been put on. This may very likely be true. The Dublas in return for their keeping the village cattle trough full are allowed the droppings of the village cattle on the cattle standing ground.

*Experiment No. 2.*—Another experiment on *juvár* was made at the same villaeg, this time, on a field situated in the poorer part of the village and assessed at a rate of Rs. 2-1-6 per acre and cultivated by a Káliparaj Dubla. Seed rates given me were 16 lbs. *juvár*, 5 lbs. *tuver* and 3⅓ lbs. *mág* per acre. From inquiries I have made I have no doubt that these figures are wrong and the real rates approximate to the rates usual throughout this part of Surat, *viz.*, 6 to 7 lbs. *juvár*, 3½ lbs. *tuver*, and ½ lb. to 1½ lbs. *mag*. The cultivator told me that he put on 26 cart-loads of manure per acre. I think this statement certainly incorrect, as it is not apparent where the Dubla could get so much manure from, and as the field did not present the appearance of having been manured. The field is a large one—9 acres 13 gunthas. Between 5 and 6 acres are under the mixed *juvár* crop and the rest is what the Taláti calls *padtar*, not waste or fallow but grass. The value of the grass is about Rs. 6 to 7 per acre. It is generally grazed and not cut. This part of the field is low and broken by a *nála* for which no *kharáb* was allowed at original survey but 13 gunthas at revision. The *nála* has probably been lately formed. The higher parts of the field appear to be an admixture of black soil and *murum* with considerable variation in the proportions. I dug holes in several places. There can be no doubt that the soil is poor. I specially selected the field to contrast its outturn with that of the first experiment, and because it is a field very typical of the poorer soils in this part of the Bárdoli táluka.

The soil was classed as Jiráyat at 7½ annas for soil, and this classification has not been altered at revision by classification for subsoil water or otherwise.

*Experiment No. 3.*— This experiment was taken at Aphwa, a *kankari* black soil village near Bárdoli. The cultivator is a Kanbi and the field is a very typical one of its kind. I am induced to think the anna estimate, 12, is low and should be 16, as the crop was probably an average full crop. The seed rates given were the ordinary rates mentioned in the last experiment as the usual ones. Fifteen cart-loads of farm-yard manure per acre are said to have been applied. This may possibly be the case, but it is certainly not customary to manure dry

crop lands every year. Manure is as a rule applied once in two or three years and generally, when *juvár* and cotton are sown alternately, before the cotton rather than before the *juvár*. The yield of *tuver* is good. The year was not good for these subsidiary pulses. When the *juvár* is a success, the *tuver* and *mag* suffer. All three are sown together. The *mag* is ready about 10th December. It is pulled up and left on the field. *Juvár* is cut about Christmas, and *mag* and *juvár* are then carted away together. The exact date of the general *juvár* harvest depends upon the ripening of the earliest fields. If one cultivator cuts, all his neighbours do the same through fear of birds. *Tuver* is left and it may be cut about 10th January or left till later. If cut early, a good many unripe pods are lost, but the land is cleared. If cut later, some early pods burst, but the plants branch out and give a rather heavier yield. My *tuver* was all cut early.

This field was classed at original survey at 14½ annas for soil and no change has been now made.

Prices at Búrdoli were:—*juvár* Rs. 24, *mag* Rs. 26, *tuver* Rs. 30 and *vál* Rs. 20 per *ga'li* of 30 Surat maunds of 40 *sers*, each *ser* weighing 37½ *tolas*. Prices of fodder vary a good deal, but *kadbi* fetches about 8 annas a hundred bundles. Grain weighments are, except in one or two cases where the amounts are quite trifling, of dry grain, the percentage reduction being ascertained by keeping 100 *tolas* of grain.

*Experiment No. 4.*—Cotton at Aphwa in a field which grows alternately cotton and *juvár*. It is a field of the same kind as that of the last experiment, *viz.*, black soil. Here too the cultivator is a Kanbi. The cotton yielded 365 lbs. per acre, which is not a very high yield. No manure was applied though it took a considerable amount of cross-examination to force the cultivator to admit the fact. This cultivator gave the seed rate at 21 lbs. per acre, stating that he put 2 maunds of seed on his bit of land which was Pot No. 1 of the field and measured 3 acres 16 gunthas. I imagine that 10 lbs. per acre is nearer the mark. The gross value of the yield was Rs. 31-10-8 and the incidence 11·38 per cent. There were three pickings from test area of 8 gunthas for this crop:—

8th February, 21 *sers*; 24th February, 50 *sers*; 9th March, just under 5 *sers*.

Revision survey classes the land as Jiráyat with 13 annas for soil. I show here how this field and that of the last experiment compare.

| Field. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | | | Rs. a. p. |
| Survey No. 70 (Exp. No. 3) ... | Juvár, &c.... | 25 2 6 | 3 13 6 | 15·28 | Soil 14½ | 4 8 6 |
| Survey No. 152 (Exp. No. 4) ... | Cotton ... | 31 10 8 | 3 9 8 | 11·38 | Soil 13 | 4 1 0 |

The revision rates are calculated at a soil maximum of Rs. 5 which is the rate proposed for Aphwa and there are no subsoil annas for either field. It will be noticed that the incidence is in each case reasonable, and there can be no doubt that a successful cotton crop is more valuable than a successful *juvár* crop. It is usual to say that "cotton is the rent-paying crop." I think this is hardly correct, for it must be remembered that a field of cotton is much more likely to fail than a field of *juvár*. So much is this the case that owners of a small amount of land often confine themselves entirely to *juvár*.

*Experiment No. 5.*—Cotton at Goji. This is a rather better field than the second *juvár* field (Exp. No. 2), there being less *murum* and more black soil. The field is a somewhat large one of 5 acres 34 gunthas with an assessment of Rs. 14-8 or Rs. 2-7-9 per acre. Of the whole field 4 acres 32 gunthas are under cotton, the rest being inferior grass land. The yield of cotton was, in my opinion, good for the field, 312 lbs. per acre worth Rs. 27-1-4, the incidence of assessment on gross produce being therefore very low, *viz.*, 9·17 per cent. It must, however, be remembered that over an acre is merely grass, while the incidence is that on the cotton area. Even so the assessment is very moderate. The cultivator is a Kanbi and the cultivation good. The anna valuation is 16. Seed rate was not clearly as-

certained, but there is no reason to suppose it differed from the usual rate which is 8 to 10 lbs. per acre An unnecessarily large amount of seed is often sown and the plants thinned out afterwards. It is better to waste a little seed than to find out—too late—that not sufficient plants have come up. No manure was applied to this crop but 20 to 30 cart-loads per acre in May 1894 before sowing *juvár*. The cotton from the test area of 8 gunthas was picked four times :—

25th January, 11 *sers* 32½ *tolas* ; 9th February, 23 *sers* 16 *tolas* ;
25th February, 24 *sers* ; 9th March, 5 *sers* 23½ *tolas*.

It may be useful to show the three Goji fields together as I showed the Aphwa fields :—

| Field. | Crop of test. | Value of gross produce per acre. | | | Assessment per acre (original survey). | | | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rs. | a. | p. | Rs. | a. | p. | | | Rs. | a. |
| Survey No. 36 (Exp. No. 1). | Juvár, &c.... | 23 | 9 | 1 | 3 | 0 | 6 | 12·89 | Soil 11½ | 4 | 5 |
| Survey No. 71 (Exp. No. 2). | Juvár, &c.... | 11 | 14 | 1 | 2 | 1 | 6 | 17·62 | Do. 7½ | 2 | 13 |
| Survey No. 69 (Exp. No. 5). | Cotton ... | 27 | 1 | 4 | 2 | 7 | 9 | 9·17 | Do. 7½ | 2 | 13 |

proposed maximum rate for Goji for soil is Rs. 6, the old rate Rs. 5-8, the village being raised from group II to group I.

*Experiment No. 6*—Cotton at Sarbhán. A black soil field under the usual cotton and *juvár* rotation. The owner is an Anavla Bráhman. He lets part of it to a Kanbi who pays Rs. 20 as yearly rent, the owner paying the Government assessment of Rs. 14-4 plus Local Funds. This bit is a subordinate number of the whole and its area is 2 acres 32 gunthas. It appears therefore that the net profit of the owner is only Rs. 4-14. The anna valuation is 16, but, though this may be correct for the field, I think 14 annas would be more correct as compared with neighbouring fields. The soil is black soil, the cultivation fairly good and 12 or 15 cart-loads of manure were put on per acre before the cotton was sown. Seed rate given, 16 or 17 lbs. per acre, is high.

Pickings from the test area of 8 gunthas were made :—

27th January, 5 *sers* 33 *tolas* ; 9th February, 19 *sers* 34½ *tolas* ;
25th February, 30 *sers* 28 *tolas* ; 11th March, 5 *sers*.

*Experiment No. 7*.—Another cotton field at Sarbhán not far from the field of the last experiment. The field (Survey No. 358, area 7 acres 11 gunthas, and assessment Rs. 24-8) belongs to a Kanbi who has given it over or let it out to another Kanbi who pays the assessment and nothing else. No manure has ever been applied to this field and so the cultivation can hardly be said to be good. All the manure that this cultivator has he requires for his rice land. The soil of this field is the ordinary *kankari* black soil. It is said to be inferior, but the people admitted that the cause of its inferiority lies in the fact that it never gets any manure. The outturn of cotton, 187 lbs. per acre, is poor. The anna valuation is 14 ; and the incidence of assessment on value of gross produce is 20·73 per cent. Pickings from 8 gunthas were made :—

27th January, 6 *sers* 34½ *tolas* ; 9th February, 7 *sers* 31 *tolas* ;
25th February, 18 *sers* 19 *tolas* ; 11th March, 5 *sers* 24 *tolas*.

Sarbhán is undoubtedly a fine village. It is in group I and it is proposed to retain it there with the same maximum soil rate, *viz.*, Rs. 6. I show these two Sarbhán fields :—

| Field. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | | | Rs. a. p. |
| Survey No. 349 (Exp. No. 6). | Cotton ... | 25 10 0 | 5 1 5 | 19·85 | Soil 14½<br>Sub-soil 1½ | 6 0 0 |
| Survey No. 358 (Exp. No. 7). | Cotton ... | 16 4 0 | 3 5 11 | 20 73 | Soil 9¼<br>Sub-soil ¾ | 3 13 6 |

The rate for unginned cotton was Rs. 80 per *bhár* of 24 Surat maunds until the beginning of March when it dropped to Rs. 77 and then to Rs. 75. I have calculated values at the higher rate of Rs. 80, as almost all the cotton was picked before the end of February.

In each case I have allowed a few *tolas* for the trifling number of bolls which a careful cultivator could manage to get after my last picking. The fields were, however, picked almost absolutely clean.

Cotton is a difficult crop to test, because it has to be guarded between the pickings. For all my cotton experiments here and in Jalálpor I employed watchmen night and day, two men to each field, from the date of my first picking to the date of my last. I paid them *bhatta* at one anna a day each. They were Government servants, that is to say, village Dheds and they were chosen from villages other than the village in which the experiment was being made and they were relieved of all other duty while watching over my fields. The fields were also visited suddenly and without warning by the Mámlatdár and trustworthy Kárkuns. Thus every possible care was taken to prevent the crops being tampered with, and the results may be accepted as absolutely correct.

The next series of experiments are those on rice and rice and a rabi crop. It is usually the custom to sow *vál*, or *val* and castor, after rice.

*Experiment No. 8.*—This is a rice field on which I was only able to test the rice, because it was followed by sugarcane which does not ripen till next Christmas. It must therefore be remembered that the incidence of assessment on gross value of produce is much higher than it would be had I been able to test the second crop. The field always has one, usually *val* or *vál* and castor. But sugarcane crops are often taken and one crop of the cane corresponds to one of rice and two of *val*, that is to say, the second crop this year and both crops next year. For example, if sugarcane is planted in November 1895 it will be cut in December 1896 and the next crop will be the rice of the monsoon of 1897. It is a common thing to plant sugarcane in rice lands in this manner provided always of course that there are irrigational facilities. In this case there is a well. I may here mention that when well water is obtained by private agreement for sugarcane, the rate customary is Rs. 5 per Bigha (27 gunthas) per crop. The rice of this experiment is of the variety known as *Kada*. It is an inferior kind, selling in the Bazár (unhusked) at 12 annas a Surat maund. It must not, however, be supposed that these lands will not grow the better varieties of rice. *Kada* is an early rice and it is advantageous to get the sugarcane sown while the ground is still damp.

The yield of rice is poor, 1,470 lbs. grain and 1,580 bundles straw per acre, valued at Rs. 32-9-10. Seed rate was 90 lbs. per acre—about the average I was told, though the formulæ rate is only 30 lbs. per acre. It was sown in a seed-bed early in July and transplanted. One cart-load of farm-yard manure per guntha is said to have been applied. I understood that this was the amount which was usually applied, but Mr. Mollison says "Mr. Seddon has certainly been misinformed as to the quantity of manure used for rice. I am sure that never more than about 30 fair-sized cart-loads are applied per acre except perhaps where sugarcane follows rice in the same year." This, as I have mentioned, is not uncommonly the case. And a good deal depends on what is meant by a cart-load. A cart-load, *gáli*, of manure in Surat is not a large cart-load.

Generally throughout the district the season for rice was poor and so it was for *vál*. There was not enough rain. It is very important to bear this in mind

when noticing the high incidence of assessment in rice lands. I have come to the conclusion, and I believe Messrs. Mollison and Mehta agree with me, that in the district a 16-anna or average full crop is 3,000 lbs. per acre of unhusked rice worth about Rs. 65 to Rs. 75. When dealing with the Chorási táluka tests, I shall quote some notes of Mr. Mehta on the cultivation of rice in Surat.

The field of this experiment measures 4 acres 12 gunthas, of which 3 acres 33 gunthas is rice land and 19 gunthas Jiráyat assessed at Rs. 55-6 and Rs. 2-2 respectively. The rice portion thus bears an assessment of Rs. 14-7-8 per acre. Of the Rs. 55-6, Rs. 13-2-4 is for tank assistance or *himayat*. Under the rates proposed for Sarbhán this rice land would bear a reduced assessment of Rs. 13-2 per acre, its classification being soil 10, subsoil 2½, rain water 8, and tank water 4½ annas. The maximum rates for Sarbhán in group I being Rs. 6 for soil and Rs. 6 for water, the old rates being Rs. 6 for soil and Rs. 10 for water.

*Experiment Nos. 9 and 10.*—These and the six succeeding experiments, which are all on the double crop, are for this and one other reason, I think, particularly valuable. The other reason is that they are under a good tank and suffered little, if at all, from the scanty rainfall. I have particularly studied the land under this tank. The better class of rices, *Kolamb* and *Bangáliu*, are grown and followed by a second crop of either *vál* and castor or wheat. Of these two rabi crops, wheat is far the most productive. But then it is also exhausting to the ground, while *vál* so far from exhausting probably renovates.

The soil of the rice lands under this tank is an admixture of black and light soils. It is more sticky than ordinary black soil. It has also a certain amount of both white and black *kankar*. It is slightly salt, and the salt, though not affecting the rice, is prejudicial to *val*. The tank irrigates about 80 fields.

The cultivator of land of Exp. Nos. 9 and 10 is a Kanbi. The owners are Girásia Inámdárs who pay a *salámi* or quit rent of only Rs. 6-9 out of a total assessment of Rs. 46. The Kanbi cultivator has always had this field and appears to have a sort of *hakk* over it. They say they pay Rs. 60 as rent. They used to pay less, but have paid Rs. 60 for the last 25 or 30 years—probably since the original survey. Seed rate is said to be 115 lbs. per acre. This is probably exaggerated, though the formulæ rate of 30 lbs. is certainly much below the mark. Sixty cart-loads of manure per acre are said to have been applied—no doubt an exaggeration. The crop was said to be an 8-anna crop with 2,477 lbs. grain per acre, worth, with straw, Rs. 71-8-3. The crop was probably really a 12-anna crop.

The rice was cut in November and *val* and castor immediately sown. Seed rates for these are given as 85 lbs. and 4 lbs. per acre—the former undoubtedly an exaggeration. No more manure of course was applied. The *vál* and castor were cut on 20th March, the acre outturn being 599 lbs. *val* and 16 lbs. castor, worth, with byproducts, together Rs. 18-10-3. The total value of the double yield was Rs. 90-2-6 per acre and the acre assessment Rs. 18-8-2, which is very heavy. But, as will be seen from the table given below, it will be reduced according to revision proposals to Rs. 13-5.

*Kolamb* and *Bangáliu* rice fetch, unhusked, Re. 1 per Surat maund; rice straw 4 annas per 100 bundles; *vál* Rs. 20 per 30 maunds; castor seed Rs. 12-12 per 7 maunds; and *vál* stalks and dried leaves and pods (valuable as fodder) Re. 1 per 3 maunds.

*Experiment Nos. 11 and 12.*—This field is slightly inferior to the field of the last two experiments and is assessed at a lower rate, Rs. 17-1-5 per acre. It is cultivated by a Kanbi. Its total area is 1 acre 15 gunthas and it is divided into two Pot numbers; area respectively 1 acre 2 gunthas and 13 gunthas. The larger piece belongs to one Lalu Pema and the smaller one to one Kuvarji Govanji. Lalu rents the smaller bit from Kuvarji for Rs. 10 and thus cultivates the whole number. Kuvarji pays the assessment of the 13 gunthas, which is Rs. 5-8. The small Pot number grows *Kolamb* rice and the large one, which is on a slightly higher level, *Kada*. My test for rice was taken in the smaller field. The outturn is poor; 1,381 lbs. grain worth, with byproducts, Rs. 42-12-6 per acre. Twenty-two cart-loads of manure per acre are said to have been put on. Seed rate doubtful. Crop estimated as an 8-anna one.

*Val* was sown throughout the field. But the lower field was entirely spoilt by cattle and I tested the upper field, taking my area of 4 gunthas in such a way as to include a portion of the *bándh*. I always endeavoured to allow a reasonable amount for uncultivable strips. It is the only fair way to do, for it is very decidedly unfair to cut 4 gunthas in the centre of a field. The *val* was fair—said to be a 16-anna crop. I strongly doubt that and should say 12 annas was nearer the mark, for the year was certainly dry. There was no castor with this *val*. The *val* was 482 lbs. per acre worth, with byproducts, Rs. 14-5-7 and the total value of the double outturn was Rs. 57-2-1, making the incidence percentage 29 91.

*Experiment Nos. 13 and 14.*—This field measures 1 acre 15 gunthas and is assessed at Rs. 23-8. There are 5 Pot numbers, 4 held by Hindus and one by a Pársi. I tested the one held by the Pársi. It measures 19 gunthas and is assessed at Rs. 8, or Rs. 16-13-6 per acre, which is almost exactly the same as that of the Pot number of the last experiment in which I took the rice. That was assessed at Rs. 16-14-9 per acre, being thus less highly assessed than the rest of the field, the average assessment on the whole field coming as I have said to Rs. 17-1-5. The rice crop here yielded 2,457 lbs. grain per acre. It is a variety known as *Bangáliu Sáliu* very similar to and priced the same as *Kolamb*. The seed rate given me was 4 maunds for 19 gunthas which must certainly be a great exaggeration. So must the manure rate in all probability, 50 cart-loads per acre. The crop is said to be a 10-anna one, which is, in my opinion, a low estimate. The value of the gross outturn for rice was Rs. 73-4-3.

The field does not always grow a second crop, it appears. It probably always can. This year the second crop was *val*. It was not a good crop. The anna estimate, 16, is certainly very high. Only 274 lbs. *val* per acre were obtained valued, with byproducts, at Rs. 8-14-8. The gross value of the two crops was Rs. 82-2-11, and the percentage of incidence 20·49, which is very moderate indeed considering that the crops were under average.

*Experiment Nos. 15 and 16.*—The second crop here was wheat. The whole survey number measured* 2 acres 5 gunthas and was assessed at Rs. 38-8. It is composed of 3 Pot numbers. Pot No. 3 measured 1 acre 19 gunthas and is assessed at Rs. 26-12 or Rs. 18-2-2 per acre, which is a high rate—reduced under revision settlement proposals. This Pot No. 3 is divided into three *kiáris* or rice fields. Two of these grow *Kada* and one *Kolamb* rice. I tested the one which grows *Kolamb* rice. I took the whole field which measured just under 20 gunthas. It is owned and cultivated by a Kanbi. It is said to have been manured at the rate of 40 cart-loads per acre; and 95 lbs. of seed were used per acre. The outturn, estimated as a 12-anna crop, probably correctly, was 2,517 lbs. grain per acre worth, with straw, Rs. 71-3-5.

After the rice was harvested, the land was harrowed with the *karab* and wheat was sown with a one-coultered drill known as *páli*. No fresh manure was, of course, applied. The seed rate was said to be 80 lbs. per acre, which is high, and less was, I imagine, really applied. The wheat crop was cut in March. The season was somewhat too dry and the crop was only estimated as a 10-anna crop. It came to 927 lbs. grain per acre worth, with byproducts, Rs. 43-2. The grain is valued at Rs. 52-8 per *gáli* of 30 maunds which was the price ruling at Sarbhán. The straw of this wheat, as of most Surat wheat, is very low. When the grain is threshed, the roots and the lower parts of the straw are cut off and thrown away to keep the grain clean, and the upper part of the straw and chaff, &c., are used as inferior fodder, being usually mixed with *val* leaves when given to cattle. Wheat was sown in all the three *kiáris* of this Pot number, but in one of them it was spoilt by stray cattle. The total value of the yield was Rs. 111-5-5 and the incidence 15·86 per cent., which is low.

I here give a table showing the particulars shown for the dry crops above. Sarbhán is, as I have said, a village of group I, old maximum rates being soil Rs. 6 and water Rs. 10 and proposed new maximum rates Rs. 6 for soil and Rs. 6 for water :—

* Its area is reduced by revision survey owing to the transfer of a strip of 8 gunthas to an adjoining number.

| Field. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|
| | | Rs. a. p. | Rs. a. p. | | | Rs. a. |
| Survey No. 299 (Exp. Nos. 9 and 10). | Rice followed by Vál and Castor. | 90 2 6 | 18 8 2 | 20·53 | Soil... ... 9<br>Subsoil ... 2<br>Rain water... 7½<br>Tank water... 8 | 13 5 |
| Survey No. 302 (Exp. Nos. 11 and 12). | Rice followed by Vál. | 57 2 1 | 17 1 5 | 29·91 | Soil* ...10<br>Subsoil ... 2½<br>Rain water... 8<br>Tank water . 8 | 14 7 |
| Survey No. 300 (Exp. Nos. 13 and 14). | Rice followed by Vál. | 82 2 11 | 16 13 6 | 20·49 | Soil† ... 9<br>Subsoil ... 2<br>Rain water... 8<br>Tank water . 8 | 13 8 |
| Survey No. 226 (Exp. Nos. 15 and 16). | Rice followed by Wheat. | 114 5 5 | 18 2 2 | 16·86 | Soil... ... 9<br>Subsoil ... 2<br>Rain water...10<br>Tank water . 7 | 13 14 |

*Experiment Nos. 17 and 18.*—These were experiments at Bárdoli on land which, for some unexplained and perhaps inexplicable reason, was classed at the original survey as Natural Bágáyat or Bháta Bágáyat. I shall have more to say about this classification of some of the Bárdoli soils when dealing with the garden land tests. Suffice it to say here that the land is ordinary rice land and has been re-classed as such. The cultivator is a Borah. The yield of rice is miserably low, 786 lbs. grain per acre, valued, with straw, at Rs. 22-4-6. The variety is *Saliu.* The season was too dry. The anna estimate given as 8 is high. Fifteen cart-loads of manure per acre were put on at 8 annas a cart-load in Bárdoli. Seed rate 85 lbs. per acre.

The *vál* outturn was slightly better, but the Patel stated that its valuation was only 5 annas. It amounted to 430 lbs. pulse per acre worth, with by-products, Rs. 11-3-2; total value of outturn Rs. 33-7-8 and incidence 37·33 per cent.

By revision survey the land is classed at soil 10, subsoil 2, and rain water 8 annas Maximum rates Rs. 6 for soil and Rs. 6 for water. This field would therefore bear an assessment of Rs. 11-4 per acre in place of the present rate of Rs. 12-8 which it bears as Natural Bágáyat. As the maximum rate for Natural Bágáyat in Bárdoli was Rs. 11-8, it may be noted that this land appears to have been classed above 16 annas.

*Experiment Nos. 19 and 20.*—This is a very typical black soil field. It is cultivated by a Kanbi. The rice outturn was poor, 1,119 lbs. valued, with straw, at Rs. 31-0-6. The variety is known as *Jhinu Sáliu*; it is slightly inferior to *Kolamb*, and priced at 15 annas the Surat maund. Seed rate was 73 lbs. per acre; and manure is said to have been 43 cart-loads per acre. The crop is not a 16-anna crop though the cultivator assured me it was. I should say 8 annas or even less. The amount of empty husks appeared very large and I was told that this is often the case with this variety of rice.

The second crop was *vál* and castor; 466 lbs. pulse and 106 lbs. oil seed per acre, called wrongly again, I think, 16-anna crop. The seed rate was 45 lbs. *vál* per acre and the castor rate was quoted at 20 lbs. which is far above the ordinary rate for castor. The field is assessed at Rs. 12-6-11 per acre and the percentage incidence for the double crop comes to 24·66, which is very moderate for a bad year.

* Classification for the Pot number growing *Kolamb* rice tested by me.

† Classification of the Pot number tested by me.

The assessment it will be noticed is low. The field itself measures 1 acre 23 gunthas and the total assessment comes to Rs. 19-8-0. Of this, Rs. 5-8-3 is for tank assistance. Besides that there is a *kasar* for a well which is in the field of Rs. 3-11-0. The well is not used for rice, nor indeed in this field at all, but in an adjoining one.

One further remark may be made. The tank from which this field gets its water is in survey number 61. It irrigates six fields (survey numbers) and brings Government in a revenue of Rs. 21-15-5 per annum. Besides that it is cultivated after the rains are over and is held by registered occupants who pay a total assessment of Rs. 39 for it, its area being 8 acres 22 gunthas. This is one of the class of cases noted in the reports of 1889-90 and 1890-91 when the late Mr. Syad Nuruddinkhán performed some experiments in these tank numbers.

The field is classed at revision survey except a few gunthas which are Jiráyat at soil 9½, subsoil 2 and rain water 8 annas (no tank water). Aphwa is to be of Group II at Rs. 5-8 for soil and Rs. 5 for water. So that this rice land would bear an assessment of Rs. 9-11-6 per acre, with no charge for the well.

*Experiment No. 21.*—This experiment is unsatisfactory. The yield of rice per acre is even less than in Exp. No. 17 and there was no second crop. The field is an ordinary rice field. It was classed as in that case as Natural Bágáyat with an acre assessment of Rs. 17-4-8. Part of this appears to be a water* rate, but the details of the classification and amount of the water rate are not available.

The land has now been classed as 3 acres 25 gunthas rice, 2 gunthas kharáb, 8 gunthas Jiráyat; and the rice classification is soil 11½, subsoil 2, rain water 8, and tank water 5½ annas or Rs. 14-7 per acre on maximum rates of Rs. 6 for soil and Rs. 6 for water, Puni being in Group I.

I do not think that much can be made out of this experiment, because (1) the rice season was bad here, and (2) there was no second crop though there is one every year as a rule. *Val* was sown but not till a month after the proper time and it came to nothing, and it appears that this was due to the cultivator, a Pársi, having delayed to sow owing to private reasons,—his own marriage. The soil is black soil; seed rate 96 lbs. per acre; manure 45 cart-loads per acre according to the cultivator's statement, which, however, is in all probability an exaggeration.

*Experiment No. 22.*—In this experiment also there was no second crop. The field is a small one—24 gunthas assessed at Rs. 5-8 or Rs. 9-2-8 per acre. It is close to the village site. The cultivators are the village Dheds, and the land is free Inám, no *salámi* being levied. The cultivation was fairly good. Manure, said to cost 12 annas a cart-load, was applied at the rate of 40 cart-loads per acre according to the cultivator's statement. Seed rate was 96 lbs. per acre. Gross outturn of grain, 1,460 lbs., worth, with straw, Rs. 32-13-6 per acre. Variety *Kada*. The percentage incidence is 27·91, which is low for a single crop in an unfavourable year.

Revision survey classification, soil 9 and rain water 7 annas or, at maximum rates of Rs. 5-8 for soil and Rs. 5 for water, Rs. 8-6 per acre.

Both *vál* and wheat are grown as a second crop in the field, though there is nothing this year. The soil was drier no doubt than usual. Possibly also the owners who have other work to do, could not find time for the second crop. But there is no doubt that the field will and does grow a second crop as a rule.

It is much to be regretted that the past season was so abnormal. It is unfortunate, too, that the Bárdoli táluka has been left severely alone in past years by experimenters, so that there is very little check on the figures given by my experiments this year. Two things, however, are, I think, shown. One is that rates, even as they are, are not too high. The other is that the revision survey proposals will entail a general reduction in the assessments on rice lands. The reduction will be found both in the case of lands originally classed as rice and in those originally classed as Natural Bágáyat.

I now turn to the garden lands. All my experiments have been taken in the Bárdoli Kasba itself and I am afraid that taken by themselves they do not

* There ought not to be a special water rate for Natural Bágáyat. But from an entry in the *Kayam Kharda* there appears to be. One other such case is noticed in Jalálpor.

afford sufficiently reliable data for any very positive deductions. Almost all Bárdoli garden cultivators belong to a caste known as Káchias. They are fairly skilful cultivators, but are almost invariably in debt.

*Experiment No. 23.*—This and the following are a couple of experiments on the small round reddish potatoes grown in the district. The field measures 3 acres 16 gunthas plus 9 gunthas *kharáb* for a well and is assessed at Rs. 27 or Rs. 7-15-1 per acre. It is Natural Bágáyat. The potatoes were planted in November and irrigated from a well in the field. Like nearly all the wells in Bárdoli, this well was only built up on top and for about 8 feet down. The seed rate was 600 lbs. per acre and about 25 cart-loads of farm-yard manure were put on before sowing and 1,500 lbs. castor cake as a top dressing after the first weeding per acre. The acre outturn was 3,436 lbs. valued at Rs. 111-10-6. This is nothing like the outturn which is got in the Kumbhária group of garden villages in the Chorási táluka near Surat, where Mr. Mollison got 7,513 lbs. in 1894. The soil was light brown *gorát* soil; well water sweet and near the surface. The plot which grew potatoes grew *suran* (Amorphophallus campanulatus) last year, before that ginger and before that some dry crop.

The re-classification of this field is soil 22 and subsoil 4 annas.

*Experiment No. 24.*—Another potato test. The field measures 1 acre 33 gunthas plus 6 gunthas well *kharáb*, assessed at Rs. 15-8 or Rs. 8-7-11 per acre and classed as Natural Bágáyat at the original survey. The soil is the same as in the last experiment and the cultivation as in that experiment is good. Fifty* cart-loads of manure were said to have been put on and 1,500 lbs. of castor cake as a top dressing. Seed rate was 600 lbs. The price of manure is 8 annas a cart-load in Bárdoli and of castor cake Rs. 7 per *khandi* (= 20 maunds = 780 lbs. about). Seed is sometimes stored and sometimes got from Jalálpor or Gáikwádi villages near Navsari. It is undoubtedly, when it has to be bought, a heavy item on the expenditure side, but the price varies immensely. Last year this piece of land had sweet potatoes and the year before *juvár*. The cultivator said his well was not enough for the whole field. I can hardly see why another should not in that case be dug. They cannot cost more than Rs. 100 each. They last very well and would last far better if the people would only keep the *Pipal* and Baniyan tree plants out of the upper masonry.

The field of this experiment is said not to grow sugarcane because of the parasitic weed known here as *agio*, the extirpation of which is practically impossible. Mr. Mollison tells me that the weed is very common among tobacco crops in Kaira, but that constant and careful removal prevents its doing much harm. Such removal is impossible with a dense growth like sugarcane.

The field of this experiment is classed the same as that of the last under revision survey.

*Experiment No. 25.*—This and the next one are experiments on the curious and interesting vegetable known as *Sakar-kand*, *Sakaria*, *Ratalu* or sweet potatoes (Convolvulus batata). *Sakar-kand* is of course the same word as our sugar-candy, both being taken from the Persian شکر قند The term *ratálu* (red root) is not in Gujarát applied to this plant, but to the large yam (see page 101 of the Manual of Revenue Accounts). Both the crops I tested are said to be 8-anna crops, because a 16-anna outturn is reckoned at half a maund per *kiári* (irrigation bed) (*i.e.*, 10,000 lbs. per acre). There were 13½ *kiáris* in one guntha and 13 in the other.

The crop must, it appears to me, give an excellent return. There is no expenditure for seed, a very heavy item in the case of most garden crops; and the acre outturn even of this 8-anna crop is more than that of the potatoes. The crop is dug up in February. Small fibrous roots remain in the ground, and in June there is a slight re-growth of the plant from these roots. These plants are pulled up and replanted in a seed-bed which has been manured with castor-cake. In that bed during the monsoon they grow large and strong. In October, pieces of the stem or upper growth about a foot in length are broken off and planted in the permanent bed in such a way that both ends are above the soil and the middle beneath it layered in fact. The free ends throw out leaves and runners, and the buried middle throws out roots which are ready to be dug up again in February. Such is the year's history.

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* Very likely a slight exaggeration.

The field measures 4 acres 8 gunthas plus 4 gunthas well *kharáb* and is assessed at Rs. 33, or Rs. 7-13-9 per acre, as Natural Bágáyat. The rotation is undefined; the cultivation good; the outturn 4,904 lbs. of fresh vegetable per acre. The manure rate given, 50 cart-loads of farm-yard manure per acre, and 100 lbs. castor-oil cake for seed-bed enough to plant one acre, is probably exaggerated. Of the whole field 7½ gunthas are under *sakaria* and the rest under various other garden crops and fruit trees.

It has been re-classed at soil 17 and subsoil 3 annas.

*Experiment No. 26.*—Twenty-one and half gunthas are under *sakaria*, the rest being under various other garden crops and fruit trees. The manure rate given was the same as in the last experiment except that only 240 lbs. of castor cake were used for the seed-bed.

The land was classed as Jiráyat under the original survey. I do not understand why. It appears to be exactly the same land as that of the last three experiments. Its well has existed for more than 30 years. Its re-classification is soil 10½ and subsoil 1½ annas. The original Bhág annas were 10½ with nothing for water.

*Experiment No. 27.*—An experiment on the mixed crop of ginger, turmeric, yams and chillies. The field is 6 acres 3 gunthas plus 5 gunthas well *kharáb*. It was classed as Natural Bágáyat. It is irrigated by an old one *kos* (bag) well. The soil is brown loamy, *pándhri gorádu*, and the cultivator a Káchia. The seed rates given were 1,400 lbs. ginger, 1,120 lbs. turmeric and 840 lbs. yams sown in May and a small amount of chillies sown in July. The manure rate was given as 70 cart-loads of farm-yard manure per acre. After manuring the land it is divided into beds, or *kiáris* as they are styled, for irrigation purposes. There are about 15 *kiáris* per guntha and in each *kiári* 2½ *sers* (of Surat) of ginger, 2 *sers* turmeric and 1½ *ser* yams are planted.

Pieces of ginger, about 2½ to 3 inches long, are put in about 8 inches from each other. In this way the middle of the bed is filled up. Along the sides turmeric is planted; in a similar manner and at each corner yams. Then about July or August the chillies are planted out after having been raised in a seed-bed. They are planted wherever a convenient space appears between the ginger plants. I chose this plot for two reasons: (1) because there were few chillies in it, and (2) because the repetition of such plots constitutes the whole of such plantations.

Last year this bit of ground produced potatoes, before that *suran* (Amorphophallus campanulatus), before that it was fallow. This year *san* (Crotolaria juncea) is to be sown and when grown, say a couple of feet high, it will be dug in as green manure. Then next June *suran* or ginger will be planted. The seed rates are high as compared with the formulæ. There are, however, no previous experiments on these plants to serve as a check. The outturn is poor, 3,377 lbs. ginger, 2,564 lbs. turmeric, 1,880 lbs. yams and 102 lbs. chillies per acre. The plants, at any rate ginger and turmeric, were not particularly well grown and I have seen both at Bárdoli and elsewhere plants very superior to these.

*Experiment No. 28.*—This is a similar experiment to the last except that yams and chillies were not tested. The survey number measures 5 acres 27 gunthas plus 3 gunthas well *kharáb* and is assessed as Natural Bágáyat at Rs. 55 or Rs. 9-11-1 per acre. The manure rate was 30 cart-loads per acre, probably a correct statement. The seed rate was 1,700 lbs. ginger, 340 lbs. turmeric and 480 lbs. yams. The outturn was 8,337 lbs. ginger and 2,564 lbs. turmeric per acre worth Rs. 150-0-4 and the incidence of assessment 6·46 per cent. The cultivator as usual is a Káchia. In my bit measuring 1$\frac{5}{16}$ guntha there were 5 yam plants and 66 small and stunted chillies which I did not test because they were not ready. Their produce would be but small. The crop was estimated as a 14-anna crop; the soil was the Bárdoli brown soil and the cultivation good.

The history of this field is interesting. The original owner thirty years ago was a Káchia by name Harji Hansji. He got involved with a Márwádi, Khushál Dungarji, and was obliged to give up the field. Khushál Márwádi became owner and Khátedár in August 1872 and the field passed to a partner of his, one Bhaisa Márwádi, by partition. In May 1874 one Dulabh Mahwa, a Káchia (no connection with Harji), bought the field from Bhaisa and got his name entered as Khátedár. To get money for this, he borrowed from another Márwádi, Dhupa Khetji, and as security mortgaged the field to Dhupa. Dhupa then got the Káchia so involved that he was obliged to give all his rights

over the field to him (Dhupa) and Dhupa's name was entered and after him his son Premchand Dhupa became Khátedár, and now lets this field and another for Rs. 200 per annum to Dhulabh Káchia's son.

*Experiment No. 29.*—The only experiment on sugarcane which I was able to get in Bárdoli. It is a dark variety known as *Rati* or *Kali Sherdi.* The field is one similar in all respects to the others treated of above. It measures 5 acres 28 gunthas plus 2 gunthas *kharáb* and is assessed, as Natural Bágáyat, at Rs. 51. I tested a piece in Pot No. 1 which measures 3 acres 10 gunthas and is assessed at Rs. 29-2 or Rs. 8-15-5 per acre. The Pot number belongs to and is cultivated by a Káchia.

The variety is a fine large cane of a deep red or reddish purple colour used for *gol* and also sold fresh as fruit. This particular crop was all cut and sold for eating purposes in the Bárdoli Bazár. It is cut as required and sold by the female members of the cultivator's family. It is fair to assume that the cultivator knows what pays best, and finds that while there is a good demand for fresh fruit it is better to sell the cane thus than to turn it into *gol*. It is always a surprise to me what a large quantity of fresh sugarcane can be disposed of as fruit in a small market. I am told that neither Malabári cane for juice nor Surti Meva for fruit do well in Bárdoli.

The cane was planted in March, after the ground had been manured at the rate of 60 cart-loads per acre. The outturn, which is called a 16-anna crop, was 28,800 canes per acre valued at Rs. 240, bringing the incidence percentage to 3·73. The crop was free from disease but damaged a little by jackals and beaten down by the rains of last October. 11,000 bits of cane were put in as seed.

I cut one guntha. From that there were 720 canes. Here they are not divided into classes, as are the Surti Meva sold in the Surat Bazár. The cultivator counts the canes in the following way. The canes are counted two by two. If each cane measures about 5 *háths*, two such canes are counted as two. If they measure a little less, a small cane is thrown in, and the three canes are still counted as two. If they are a good deal short, two small canes are thrown in, and the four counted as two. The unit in fact is "5 *háths* of cane." According to this counting my 720 canes became 500; and the cultivator got 1,000 canes for seed at Rs. 12 with which he planted about half an acre.

The canes are sold retail at from ½ pie to 1 pice each. The cultivator admitted the value of the lot, one guntha's produce, at Rs. 6 and I think this is about right. The Mámlatdár reports Re. 1-4 per hundred which would bring the price over Rs. 9. It must be remembered that the cutting and selling of the canes entails a good deal of labour. This is, however, all home labour, the canes being sold, as I have mentioned above, by the women of the family in the Bazár.

I add here a table showing incidence and rates as before. Maximum soil rate is Rs. 6:—

| Field. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|
| | | Rs. a. p | Rs. a. p. | | | Rs. a. p. |
| Survey No. 257 (Exp. No. 23). | Potatoes ... | 111 10 6 | 7 15 1 | 7·11 | Soil 22 ... Subsoil 4 ... | 9 12 0 |
| Survey No. 269 (Exp. No. 24). | Potatoes .. | 104 11 0 | 8 7 11 | 8·11 | Soil 22 ... Subsoil 4 ... | 9 12 0 |
| Survey No. 190 (Exp. No. 25) | Sweet potatoes . | 130 0 0 | 7 13 9 | 6·04 | Soil 17 ... Subsoil 3 ... | 7 8 0 |
| Survey No. 204 (Exp. No. 26) | Sweet potatoes . | 112 8 0 | 3 6 4 | 3·02 | Soil 10½ ... Subsoil 1½ ... | 4 8 0 |
| Survey No. 195 (Exp. No. 27). | Ginger, &c. ... | 88 10 8 | 9 11 5 | 10·96 | Soil 20 .. Subsoil 4 ... | 9 0 0 |
| Survey No. 194 (Exp. No. 28). | Ginger, &c. ... | 150 0 4 | 9 11 1 | 6·46 | Soil 22½ ... Subsoil 4 ... | 9 15 0 |
| Survey No. 239 (Exp. No. 29). | Sugarcane ... | 240 0 0 | 8 15 5 | 3·73 | Soil 21 ... Subsoil 4 ... | 9 6 0 |

The facts ascertained indicate that Survey Number 204 was under-assessed and that the under-assessment is to be continued I may here point out that my revised rates are all calculated without the modifications which the application of the distance from village site scale will entail. In some cases the assessment will be slightly above and in some cases slightly below the rates I have given. It is impossible for me without knowing the distance scale to say how much in each case. But the theory of the scale is of course that while some fields are raised and some are lowered, the gross assessment is unaltered. In my opinion the general results of the garden crop experiments as well as my own personal observations indicate that the garden lands here cannot compare either with the Chorási garden lands near Surat at Kumbháriа, Magob, and one or two other villages or with the better villages of the Jalálpor táluka. And it is only the general results like these which can be expected, inasmuch as the land assessment plays a very insignificant part in the expense of raising such a crop as sugarcane in comparison with such items as cost of manure, labour for irrigation, price of seed, &c.

## JALA'LPOR TA'LUKA.

There were seven tests on *juvár* and *juvár* with subordinate pulses taken this year, four by myself and three by Mr. Wood. There were four tests taken by myself on cotton. The year was a fair average year for both these crops and the cotton and *juvár* tests taken together indicate very well, I think, what the burden of the assessment really is. It is important to remember that the cotton and *juvár* rotation is *the* common cropping here.

I am unable to give here, as in the case of Bárdoli, the revision survey rates and classification, because the classification has not yet been done. The only thing that can be done is to show clearly how the present rates fall. The original Bhág annas are often not yet deduced.

*Experiment No. 30.*—A dry crop field assessed at the high rate of Rs. 6-4-3 per acre. The soil here and throughout this part of the táluka is black soil with some admixture of *kankar*. It was classed at 16 annas at the original survey. It was unmanured this year, but about 20 cart-loads of manure are put on every two or three years. The cultivator is an Anavla Bráhman. The *juvár* plants were tall and the heads fairly large, but the space between the plants somewhat great. For this reason the crop is held only to have been a 14-anna crop. The outturn was 793 lbs. *juvár*, 72 lbs. *tuver* and 2½ lbs. *mag* valued, with byproducts, at Rs. 24-14-8. The variety of *juvár* is known as *Chapti juvár*. It is priced at Rs. 27-8-0 in the Navsari Bazár per *gáli* of 30 Surat maunds, while the commoner variety *Pirio juvár* fetches only Rs. 27. *Chapti* is white, *Pirio* yellow. The seed rates were 9½ lbs. *juvár*, 1½ lbs. *tuver*, and ½ lb. *mag* and a handful of *choli* and *math* (Phaseolus aconitifolius) which came to nothing. It will be seen that *mag* also was a mere trifle and *tuver* very little. The incidence of assessment works out to 25·14 per cent.

*Experiment No. 31.*—The same crop on similar land at the village of Eru assessed at Rs. 4-5-5 per acre and classed at original survey at 15½ annas. It is cultivated by an Anavla Bráhman who says he sold the whole crop, a month before it was ready, to a Kumbhár for Rs. 69, the field, all of which is under *juvár*, measuring 5 acres 26 gunthas and assessed at Rs. 24-8. The crop is put down as a 16-anna crop, and there were great stretches of *juvár* at least on this side of the táluka of much the same appearance as this field. The rotation is the ordinary cotton and *juvár*.

The field was unmanured this year, but manure, whatever is available, is applied every three years. The outturn of grain was 865 lbs. *juvár*, 43 lbs. *tuver* and 29 lbs. *mag* valued, with byproducts, at Rs. 25-2-1 and the incidence works out to the moderate figure of 17·26 per cent.

*Experiment No. 32.*—The field chosen was a poor one, but there was a good deal of such *juvár* round about Hansápor, where the soil struck me as inferior. The cultivator is a Koli. He stated that 20 cart-loads of manure per acre were put on before sowing. My own very decided opinion is that this was untrue. The field did not look as if it was manured and I do not believe it was. The crop

suffered a little from the scanty rainfall, the soil appearing to be more thirsty than the Vijalpor or Eru land. The crop was estimated as a 12-anna one. The rotation is cotton and *juvár* and the assessment Rs. 3-5-1 per acre. Gross outturn was *juvár* 453 lbs, *tuver* 10 lbs., and *mag* 24 lbs. per acre, valued, with by-products, at Rs. 13-11-4; and the incidence of assessment works out to 24·20 per cent. The seed rate given was 14 lbs. *juvár*, 2 lbs. *tuver*, and 2 lbs. *mag* per acre; 8 lbs. *juvár* would probably be nearer the mark.

The soil was classed at 14 annas, which appears to me to be high. In this field there are six shares—three supposed to be good and three inferior. I could detect no difference in the crop. But I may add that my 8 gunthas were in one of the supposed inferior bits.

*Experiment No. 33.*—This is a 14-anna crop at Jalálpor. Soil the same as at Vijalpor and Eru; no manure this year but 20 to 30 cart-loads per acre before last year's cotton; rotation cotton and *juvár*; owner an Anavla Bráhman; cultivator a Koli, who pays a rent of Rs. 81 for 3 acres 12 gunthas of this *juvár* land and 3 acres under cotton in another field, the owner paying the assessment of about Rs. 24. The whole field measures 6 acres 23 gunthas and is assessed at Rs. 23. It is divided into two almost equal Pot numbers, each assessed at Rs. 11-8. Pot No. I is 3 acres 12 gunthas assessed at a rate of Rs. 3-7-9 per acre and classed at 14½ annas as Jiráyat land. The other Pot No. is under grass.

The acre yield was 846 lbs. *juvár*, 9 lbs. *tuver* and 7⅕ lbs. *mag* valued, with by-products, at Rs. 22-12-9. The incidence of assessment thus works out to 15·28 per cent., which is very low considering that this is a 14-anna crop and the next year's crop will be cotton. Seed rates were given as 14 lbs. *juvár*, 1⅔ lb. *tuver*, ⅚ lb. *mag* and 5/12 lb. *choli* per acre; 8 lbs. of *juvár* is enough, and if more be sown the plants have to be thinned out afterwards.

Mr. A. Wood, Assistant Collector, submits three tests taken at Vijalpor, Bodáli and Sisodra on *juvár* in this táluka. He intended to select one field of black soil, one of *gorát* and one of *besar*, but had no time to do so. In the body of the report, Mr. Wood calls all the fields *káli besar* and observes in the remarks "the Patels and cultivators insisted on using this term, but that it was the right one only for the Vijalpor field. The Sisodra field was certainly black soil, but not of a good quality, containing grains of *kankar*. The Bodáli field was called by the Mámlatdár *gorát*, but I should call it *gorádu besar*, but it was not greatly different from that in Vijalpor." My own experience of the táluka is that nearly all the dry crop soil is black soil, but the amount of *kankar* in it varies.

*Experiment No. 34.*—The field at Vijalpor measures 4 acres 19 gunthas and is assessed at Rs. 28 or Rs. 6-4-1 per acre, so that it is very similar to that of Exp. No. 30. The rotation is cotton and *juvár*. The cultivation is described as good. No manure was applied. The seed rate is given as 11½ lbs. and the outturn of the *juvár* as 975 lbs. of grain valued, with byproducts, at Rs. 23-15-6. The incidence works out to 26·09 per cent. Subordinate pulses were not tested and were trifling. The crop is said to be a 16-anna one. Mr. Wood remarks: "The anna valuation as usual is perverse, the cultivator in all cases estimating the crop of experiment at 16 annas and the last crop of *juvár* grown on the same field at 8 annas, though neither season was much above or much below the average".

*Experiment No. 35.*—The Bodáli field gave a very superior outturn. Indeed, it was a very heavy crop: 1,327 lbs. of *juvár* per acre plus 345 bundles *kadbi* valued at Rs. 31-10-9. The assessment is Rs. 5-4-2 per acre. Forty cart-loads per acre of farm-yard manure are said to have been applied before sowing. The rate is probably exaggerated. Mr. Mollison thinks that even rice does not get so much as that. The rotation appears to be practically cotton and *juvár*, but this is not quite clear from the entry of column 10. The anna valuation is 16, and the outturn corresponds to a 17-anna formulæ yield. The incidence of assessment, 16·60 per cent., is fairly low.

*Experiment No. 36.*—The Sisodra field gave a very poor outturn. No manure was applied and the outturn is only half (499 lbs.) of that of the Vijalpor field. The assessment too is only half, Rs. 3-2-10 per acre. The subsidiary

pulses have been tested here, *tuver* giving 43 lbs. and *mag* 7 lbs. per acre. The incidence of assessment is very moderate, 21·15 per cent.

I now turn to the cotton tests. They were all done by myself and the crops were guarded in the same way as at Bárdoli. A curious and unsatisfactory point comes out. The fields most lowly assessed have produced far the best crops. I consider the cotton as a 16-anna crop throughout the district. The clear weather and absence of clouds favoured the maturing of the bolls and discouraged disease. The rate for cotton has been taken at Rs. 80 for the *bhár* of 24 Surat maunds which was the price ruling until the beginning of March.

*Experiment No. 37.*—Black soil of the kind mentioned above. The Khátedár and cultivator is a Dhed. I consider the crop as a 14-anna one as compared with other fields, but am content to admit that it may be, as it is said to be, a 16-anna crop as compared with the usual crop of the field. The Pot number measures 1 acre 30 gunthas and is assessed at Rs. 10-4 or Rs. 5-13-9 per acre, the original bhág annas being 16.

The outturn of cotton was 317 lbs., which is a low outturn valued at Rs. 27-8. The incidence of assessment comes to 21·30 per cent. The cultivation is hardly good. But it cannot be described as indifferent. The field appears to be manured one-third every year. The cultivator told me he put 7 cart-loads before this crop on one bit, 8 last year on another bit and 9 the year before on a third bit. My 8 gunthas were chiefly in the bit manured with 8 cart-loads last year, but a small part was in the bit manured this year ; which that bit was was clear, as the plants were considerably taller and better developed in one corner of the field. The seed rate was given as 13½ lbs. per acre. Pickings on 8 gunthas were made thus :—

30th January, 5 *sers* 28 *tolas* ; 16th February, 30 *sers* 12 *tolas*.
27th February, 22 *sers* 14 *tolas* ; 12th March, 7 *sers* 22½ *tolas*.

and I have added a few *tolas* for a possible after picking. The field was, however, picked almost absolutely clean. The rotation is cotton and *juvár*.

*Experiment No. 38.*—The Pot number measured 2 acres 8 gunthas and was assessed at Rs. 8-10 or Rs. 3-14-9 per acre. The original classification annas are 15.

The cultivator is a Koli and the owner an Anavla Bráhman of Sarbhán, táluka Bárdoli. The Anavla lets in all 8½ acres of land assessed at Rs. 32-15 plus Local Fund Rs. 2-1, in all Rs 35, and the Koli pays Rs. 55-12 as rent. Profit to the owner is thus Rs. 20-12. For it is invariably the custom here for the superior holder to pay the assessment. The cultivation I characterize as good. A light dressing of 9 cart-loads of manure to the acre was applied. The anna estimate of the crop was 16. The gross outturn was 430 lbs. of seed cotton per acre, valued at Rs. 37-4-8. The incidence works out to 10·49-per cent. which is very low. Seed rate was given at 8 lbs. per acre which is probably correct here and the usual rate throughout the district.

Pickings on 8 gunthas were made thus :—

3rd February, 18¼ *sers* ; 16th February, 42 *sers* 3 *tolas*.
27th February, 22¼ *sers* ; 13th March, 6 *sers* 5 *tolas*.

I consider this crop a very fair average specimen.

*Experiment No. 39.*—This and the following were two fields close together, about a couple of hundred yards away. The outturn of the second field is much the better, because the land had been under grass till recently. The field of this experiment measures 3 acres 14 gunthas plus two gunthas for *kharáb* and it is assessed at Rs. 22-6 or Rs. 6-10-10 per acre as Natural Bágáyat.

The cultivator is a Kanbi. The cultivation is good, that is to say, ordinary. Eight or nine cart-loads of manure are put on per acre every other year, before the cotton of the cotton and *juvár* rotation. The anna estimate is 16. In places the plants are a little far apart. The soil is the ordinary *kankari* black soil. The outturn was 341 lbs. seed cotton per acre valued at Rs. 29-9-4. Pickings from 8 gunthas were taken thus :—

29th January, 21 *sers* ; 15th February, 37½ *sers* ; 27th February, 12½ *sers*.

Seed rate was given as 12 lbs. per acre. Why this land was treated as Natural Bágáyat I do not know. Besides cotton there is *juvár* (about 25 gunthas) and a

mango grove (about 15 gunthas). I found neither *juvár* nor mangoes entered in the Talátí's Form No. III, though of course they both ought to be. The land is ordinary Jiráyat and there is no reason whatever for calling it Natural Bágáyat. The owner has the right (*hakk*) to take water from a well in another field (Survey No. 487) on payment of Rs. 5 per Bigha to the owner of the well. This well is called a *Sarkári* well in the *Káyam Kharda*. No one seemed to know why. The field of the experiment is not now under garden cultivation because it was not found to produce garden crops profitably.

Rs. 4-6 is entered in the remark column of the *Káyam Kharda* " for the use of the *Sarkári* well in Survey No. 487". This is included in the assessment of Rs. 22-6, but is not as usual shown in column 13 of the Form. It should not be levied at all ; for the well is not in the possession of the man who owns Survey No. 498 and who is asked to pay for it, and he cannot use the water without paying the owner of the well for it. In fact if he uses the water he has to pay for it twice, and if he does not use it he has to pay for it once.

*Experiment No. 40.*—This field measures 5 acres 8 gunthas plus two gunthas *kharáb*. The original classification annas are 14. It is now under the ordinary cotton and *juvár* rotation, but three years ago it was a grass field which accounts for the superior yield. The cultivator is a Kanbi. No manure was put on. Seed rate is given as 12 lbs. Pickings from 8 gunthas were made :—

29th January, 33⅞ *sers* ; 14th February, 38½ *sers* ; 27th February, 26¾ *sers*.

And I allowed ⅞ *ser* for subsequent ripening. The outturn is the best I have had, still I have often seen fields better. The incidence of assessment comes to 11·54 per cent., which is very moderate. Total outturn was 481 lbs. per acre valued at Rs. 41-10-8.

It may be noted that seven experiments on *juvár*, &c., gave an average incidence of 20·38 and I think that 20 will be found to be the average incidence of *juvár* for a 16-anna crop. Four experiments on cotton gave an average incidence of 15·63 and the dry crop of the cotton-*juvár* rotation pays an assessment which is 17·51 per cent. of the gross outturn. Average value of *juvár* crop comes to Rs. 22-7-4 and of cotton Rs. 34-0-2. Average value of the rotation Rs. 28-4 per acre. I believe these figures represent with very considerable accuracy what is actually the fact. And it must be added that what it is important to know is the proper dry crop rate. Maximum rates for Jalálpor are at present :—

| Village. | | Group. | | | Maximum soil rate. | | |
|---|---|---|---|---|---|---|---|
| | | | | | Rs. | a. | p. |
| Jalálpor | ... | I | ... | ... | 6 | 4 | 0 |
| Vijalpor | ... | I | ... | ... | 6 | 4 | 0 |
| Bodáli | ... | II | ... | ... | 6 | 0 | 0 |
| Eru | ... | III | ... | ... | 5 | 8 | 0 |
| Hansápar | ... | III | ... | ... | 5 | 8 | 0 |
| Sisodra | ... | III | ... | ... | 5 | 8 | 0 |

I now turn to the rice tests. They are, I fear, of less value than the dry crop experiments. The rice year was, as I have remarked before, of rather an exceptional character owing to the failure of the later rains. Moreover, the experiments (3) which I could get were not sufficient in number. One of them was only on the first crop, as the second was sugarcane. Mr. Forbes of the Revenue Survey also did one experiment, but did not test the second crop.

*Experiment Nos. 41 and 42.*—This field gave extremely good results. It measures 1 acre 5 gunthas and is assessed at Rs. 19-8. It is made up of two parts, Bágáyat 37 gunthas assessed at Rs. 18-4 or Rs. 19-11-8 per acre and Jiráyat 8 gunthas at Rs. 1-4 or Rs. 6-4-0 per acre. It will be re-classed of course as rice land. The Bágáyat is Natural Bágáyat, there being no special water rate shown. The soil is the ordinary black *kankari* soil and it should not be classed as Bágáyat. It is irrigated, for the first crop only, from a tank. The field grows rice and *vál* and sugarcane. For sugarcane, water from a neighbouring private well is available at a payment of Rs. 5 per Bigha (27 gunthas) per crop.

The variety of rice was *Júdu Saliu* sold at 14 annas the Surat maund at Navsari. The seed rate was 104 lbs. per acre. Fifty-four cart-loads of manure per acre are said to have been put on before the rice; 25 cart-loads on 18½ gunthas. I suspect this is rather an exaggeration, but I must say that the cultivator, an Anavla Bráhman, struck me as an extremely honest and straightforward man. He put the crop at 12 annas. The outturn was 3,349 lbs. grain per acre. The formula gives 3,000 lbs. for a bumper crop, but the commentary on this is that the formula is wrong. The rice is grown only in the Bágáyat portion, the rest of the field being grass and shrubs. The Bágáyat bit, 37 gunthas, is divided into two equal shares by a low *bándh* or *pál* the owners of which are different. The half in which I cut my rice and *vál* belongs to one Hari Gopálji, who owns in all 45 Bighas of land and has three *Hális* (servants). He told me he had four, but one ran away about a year ago. Hari says he is Rs. 3,000 in debt.

After the rice, *vál* and castor were sown. These plants do not grow like rice close up to the bank, because after the rice is taken off, the field is only roughly ploughed and the edges remain unploughed. It is a common practice to utilize the edges by sowing *san** (hemp) which will grow whether the soil is ploughed or not, the seeds being small. In this field there was no *san*, the cultivator saying he had no time to sow it; it was too much trouble. In consequence there was a rather broad bare strip all round, and I have allowed for this in plotting out the 8 gunthas which I measured for the *vál* test. I have always done this, as it is unfair to cut a bit out of the middle of the field as is sometimes done by experimenters.

The seed rate given for *vál* was 54 lbs. and for castor 5½ lbs. per acre. No fresh manure of course was applied for the second crop. The outturn was 1,685 lbs. *vál* per acre and 27 lbs. of castor. There were also about 1,150 lbs. of *vál* leaves and husk useful as fodder. The total value of the second crop comes to Rs. 37-15-11 and of the year's outturn Rs. 122-6-8, which brings the incidence of assessment to 16·11 per cent.

*Experiments Nos. 43 and 44.*—The field of these experiments is a very similar one in the village of Hansápor. The Pot number measures 25 gunthas, assessed at Rs. 7-4, which include Re. 1-15-3 for tank water. The field grows much the same crops, rice, *vál*, castor and sugarcane. The cultivator is a Koli. He says he put on 35 cart-loads of manure per acre. The soil is *kankari* black soil. The seed rate was given as 154 lbs. per acre, a high rate. The outturn was 1,703 lbs. grain per acre, rated as a 16-anna crop by the cultivator, and I think probably a 12 or 13-anna one in reality. The value of gross outturn for the rice was Rs. 38-14-4, the variety being *Kada*. Sugarcane when grown is irrigated from a neighbour's well, the water of which has to be paid for. The second crop was *vál* and castor which gave a poor outturn, 335 lbs. of *vál* and 21 lbs. of castor. In the area cut there was a somewhat large patch of bare ground in which the *vál* would not grow owing to the shade of some mango trees. I allowed what I considered a proper proportion of bare ground in the area tested. But I am now sorry I did so, because the fruit of the mango trees is doubtless more valuable than the *vál* the trees prevent growing.

The incidence of assessment works out to 23·76 per cent. and in ordinary years it would be considerably lower.

*Experiment No. 45.*—The rice crop from this field at Vijalpor was very inferior, producing only 1,578 lbs. grain per acre valued, wth straw, at Rs. 37-1-2. The anna valuation was given as 14. This is, I think, too high and I should be inclined to say that 10 or 12 would be nearer the mark. Twenty-five cart-loads of manure per acre were put on. The seed rate given was said to be 1¼ maund for 8 gunthas which equals 240 lbs. per acre. This, however, is not a fair way of calculating. For a small bit more seed proportionally is used than for a large piece. Moreover, some of this seed was intended for another rice field which was not planted afterwards, and I saw a decaying heap of seedlings lying on the ground.

* The seed produced from this *san* is then sown early next monsoon in a rice bed and subsequently dug in as green manure (*vide* Exp. No 46).

The whole field of 2 acres 26 gunthas is divided into 5 Pot numbers. Pot No. 4 which I tested measures 37 gunthas and is assessed at Rs. 16-8 or Rs. 17-13-5 per acre as rice land. The field is about 300 yards from a small tank the water of which was nearly all dried up by the middle of October. The field appears to grow sugarcane once every four or five years, with rice and *vál* in the intermediate years. It has been planted with sugarcane this year, and therefore I could not test the second crop. The incidence on the rice this year was 48·11 per cent. This appears high, but I do not know that it really is, considering how much sugarcane is got off the field. Sugarcane is irrigated from a well in the field, which well was built some ten years after the original survey.

Of the Rs. 16-8 which is the assessment of the 37 gunthas, Rs. 5-5-1 is for the tank water *himáyat* or protection. The water from the tank is rated at Rs. 11-8 per acre as a 16-anna rate. The field of our test is assessed at 8 annas, an acre rate of Rs. 5-12 therefore or Rs. 5-5-1 for the 37 gunthas.

*Experiment No. 46.*—Mr. Forbes of the Revenue Survey reports an experiment on *Kolamb* rice at the village of Sari-buzrag in the south of the táluka. It is unfortunate that there was no second crop this year. It appears to be grown almost every year.

The land is alienated, village service Inám, land. It is a black soil field partly rice, 1 acre 2 gunthas assessed at Rs. 19-8, of which Rs. 7-8-9 are for tank water, and partly dry-crop, 12 gunthas at Rs. 1-8 ; total 1 acre 14 gunthas at Rs. 21. The 12 gunthas of Jiráyat have since been converted into rice land. Mr. Forbes has calculated the assessment per acre only on the 1 acre 2 gunthas of original rice. It comes to Rs. 18-9-1 ; calculated on the whole field, which all appears to be under rice now, it is Rs. 15-8-10.

Mr. Forbes says that till this year *Kada* rice was always grown, but as the field was damp in October, the sheaves had to be carted away to dry, and this year *Kolamb* was sown for the first time as an experiment. To try and make this experiment a success, the cultivator applied considerable quantities of manure. Seven gunthas of seed-bed had 10 carts of manure. To the rest of the field, presumably 1 acre 7 gunthas, 25 cart-loads of manure were applied. The land was then ploughed and 1½ maunds of *san* seed, costing Re. 1 per 1¼ maund, sown. The *san*, when about two feet high, was ploughed in. The field was twice ploughed and then levelled. It was twice weeded. The crop was four times watered from a tank. When the rainfall is good, water is taken only once or twice or even not at all. This year the water was taken in the middle of September, and the beginning, middle and end of October. It appears that the end of October was rather late, as the crop was cut on 11th November.

The owner is said to let the field for the Government assessment, gaining himself only the difference between full assessment and *salámi*. The experimenter says that the Patel informed him that land in the village is usually let at a profit of Rs. 7 per acre, but as this field cannot grow sugarcane owing to its being slightly salt, and there being no wells near it, only the Government assessment is got.

The outturn estimated by the experimenter as a 16-anna crop was 2,600 lbs Mr. Forbes did not allow for dryage, as he states that he found no difference after a fortnight. I have taken a reduction of 2 per cent and enter the grain outturn as 2,548 lbs. and total value at Rs. 70-8-11. Incidence then works out to 26·31 per cent.

There are four experiments on garden crops—two on sugarcane by Mr. Fernandez, Deputy Superintendent Gujarát Revenue Survey, one on sugarcane by myself, and one on groundnut by myself. In addition to these I have added to the list an experiment on castor seed by Mr. Weir in 1893 and five experiments on sugarcane, one by Mr. Robertson in 1887, one by Mr. Moore in 1888, one by Mr. Maconochie in 1891, one by Mr. Dodoret in 1893 and one by Mr. Cadell in 1895. We have therefore a series of eight experiments on Jalálpor sugarcane, and as the tests were taken by different officers in different years and all, I think I may say, with care, they give a very fairly accurate indication of what the outturn of *gol* per acre really is. There are three varieties commonly grown in

Jalálpor—*Ráti*, *Malbári* and *Vánsi*. *Ráti* is the dark purple variety which I experimented on in Bárdoli.* It is not so common in Jalálpor. *Malbári* is considered the best, but it will not grow everywhere, for instance in Jalálpor Kasba. *Vánsi* (like a bamboo or *vans*) is a common variety. The canes are thin, white and rather tall. *Malbári* and *Vánsi* are grown mixed sometimes; they were in Mr. Doderet's test in 1893.

*Experiment No. 47.*—The sugarcane experimented on was *Vánsi*. The field measures 2 acres 38 gunthas and is assessed at Rs. 24-8 or Rs. 8-4-11 per acre as Natural Bágáyat. The soil is *besar*, but not the rich garden soil which can be classed as Uttam Bágáyat. The original Bhág annas have not been deduced. The land grows sugarcane once in four years and such crops as *tuver*, *san* and groundnut between. The cultivator told me that he had given up growing groundnut, as he found that sugarcane and groundnut was not a good combination. I should have supposed groundnut an excellent rotation crop myself, provided the land was manured for it.

Thirty cart-loads of farm-yard manure per acre were put on before sowing and about 54 cart-loads of fresh soil were spread on afterwards. The seed rate was 14,000 sets of cane per acre or 1,000 canes of 6 *háths* each, planted in January 1895. The *gol* produce per acre was *5,538 lbs. and there were 8,000 lbs. green tops and outer leaves not weighed. The green tops are usually given to the bullocks which work the roller. The outer leaves are either burnt or used for thatching purposes. The fuel for the furnace is mostly composed of the dry refuse of the cane after the juice has been crushed out. The gross value of the outturn was Rs. 272-8, calculating the price of *gol* at Rs. 1-14 per Surat maund or 20½ lbs. per rupee. Mr. Cadell in his experiment last year took exactly the same price. I ascertained the price in the Navsari Bazár for the particular specimen of *gol* produced. It is of course well known that the price of *gol* is going down—a good deal comes down now from the North-Western Provinces, especially Cawnpore. The press used was a three-roller iron one. Almost all the presses in use now are iron. The incidence of assessment comes to 3·04 per cent.

I have not described the cultivation because it has frequently been described before, because I shall have occasion later on of describing exactly similar cultivation, and because the two following experiments conducted by Mr. Fernandez and analysed by Mr. Mollison show exactly the methods of this part of the world. I shall later on give a table showing the results obtained from all the sugarcane tests in the Jalálpor táluka. I may here say, however, that *Vansi* cane is not usually planted like the *Malbári* cane of Mr. Fernadez's experiments by means of a plough with a tube. The pieces of cane are simply trodden into the soft wet soil.

*Experiments Nos. 48 and 49.*—Mr. Mollison has analysed these two experiments as follows :—

"These two experiments on sugarcane were taken on two consecutive days in Munsád. The first field was not well fenced, and jackals had done damage. In this field the test area was only 1 guntha and perhaps it was not sufficient to get a fair averge for the field. In selecting the test area, count should have been taken of damage done by jackals and also of the usual inferiority of the crop round the headlands. The outturn from each field is well above average judging by the results of careful tests in former years in the same táluka. I fear that the actual outturn per acre would fall short of the acre average as calculated from the results of the test areas. It is, however, likely, as Mr. Fernandez reports, that 'although the soil is not of the superior order, yet with plenty of water at command and intelligent cultivation sugarcane can be grown with handsome profit.' The soil of each field is of like character, being black with a reddish tinge and classable at 16 annas. The respective assessments, soil and water combined, are Rs. 10 and Rs. 9-4-9 per acre. Each number is irrigable from a well, the water being abundant up to April and somewhat scant afterwards. The late rains were deficient in 1895-96, but this could hardly have affected the crops, as they were harvested in November. The late rains of 1894 were unusually abundant, and it may be presumed that during the hot weather of 1895 the water in the wells was less scant than usual. Both fields grow usually rice and second

* The actual weight, not the commercial weight which assigns a fictitious weight for the pots,

crop of *vál* and castor. In the first field cane has usually been grown every sixth year. In the second field it was grown for the first time. No manure was given to the field before plantatation, but a top dressing of 58 maunds or approximtaely 2,230 lbs. of castor cake per acre was given in July. Thirty loads of farm-yard manure was given for the previous rice crop and the field was obviously in good condition, or it would not have yielded so well. The first field got a direct application of 20 loads of cow-dung manure, apparently to 38 gunthas, before plantation. The application to the previous rice crop was 40 cart-loads; the sugarcane was top-dressed in July with 70 maunds of castor cake.

"The cane was planted with the plough, whole canes being used. The canes are passed through a hole drilled in a slowly backward direction through the body of the plough and left imbedded in the soil in the furrow and about 8 inches deep. This operation is facilitated by a man following the plough and trampling each cane into the furrow as it is pushed through the hole in the plough. The seed rate is calculated in lengths of 6 *háths* (about 9 feet); 2,600 six-*hath* lengths were planted in the first field and 2,500 in the second. No single cane would be 6 *háths* long, probably on an average 2 to 2½ canes* would be required for this length. The fields were watered when planted and not again for eight weeks. The first field was irrigated in all fourteen times—and mostly during the hot season; 2 waterings were given during the rains and 2 after they ceased. The second field was irrigated twelve times before the rains, once during and twice after. Generally throughout Gujarát it is customary to put *gol* in earthenware pots; when sold, a deduction of 5 *sers* per maund is allowed on account of the pots. Mr. Fernandez found by actual test in the first experiment that the weight of pots exceeded the allowance made. He, however, adopted the commercial weight, which of course at market rates shows the correct value per acre of each crop.

"The exact per acre weight of *gol* in the first experiment is given, but in the second experiment the weight of *gol* is only approximate, because Mr. Fernandez did not test the weight of earthenware pots as he did in the first experiment. Applying the same data to both experiments the weights of the various products are as under :—

| | 1st Experiment Lbs. | 2nd Experiment Lbs. |
|---|---|---|
| Cane-topped ... ... | .... 68,824 | 81,415 |
| Juice ... ... | ... 48,849 | 56,437 |
| Gol ... ... | ... 8,049 | 8,972 |
| Percentage of juice to cane | ... 70·97 | 69·32 |
| Do. of Gol to juice | ... 16·47 | 15·89 |
| Do. of Gol to cane | ... 11·69 | 11·02 |

The incidence works out to 2·15 per cent. in the first experiment and 1·83 per cent. in the second."

The field of Exp. No. 48 measures 38 gunthas and is assessed at Rs. 9-8 or Rs 10 per acre. It was classed as rice land. Gross outturn worth Rs. 464-4-9 per acre.

The field of Exp. No. 49 measures 2 acres 34 gunthas and is assessed at Rs. 26-8 or Rs. 9-4-9 per acre. There is no tank rate, but a well *kasar* of Rs. 1-8 is included in the Rs. 26-8. It was classed as rice land and the value of gross outturn comes to Rs. 494-11-7 per acre.

Both fields are sugarcane growing rice fields.

It will be noticed how much heavier the outturn of Mr. Fernandez *Malbári* cane is than that of any *Vánsi*. I should like to have had some more experiments and I am rather inclined to think that the results here obtained are a little more than can usually be expected. But Mr. Doderet's mixed *Malbári* and *Vánsi* test in 1893 gave better results than any of the *Vánsi* tests, and in the case of *Malbári*, the percentage of *gol* to cane was 11·3 and with *Vánsi* 6·5.

Of Survey No. 481 (Exp. No. 49) Mr. Fernandez mentions that the land is Ját Inám belonging to a Navsari Pársi, who lets it to a Kanbi of the village for Rs. 40 plus Rs. 11-8-6 to Government for *salámi* and Local Fund, in all Rs. 51-8-6. The field has been with the Kanbi family for two or three generations. The

* From 2½ to 3 canes.

rent appears to me large. Not only so, but it is the almost universal practice in the Surat district for the superior holder to pay the Government dues. The Mámlatdár informs me in answer to a reference that the Rs. 11-8-6 is deducted from the Rs. 40 rent. Mr. Fernandez remarks that the rayats of Munsád are all involved in debt, and decides that this is due to increase of population and lack of manure.

Mr. Fernandez says the results of the experiments show that "sugarcane can be cultivated with handsome profit." But the profit depends almost entirely upon the cost of cultivation in the case of a crop like sugarcane, and we are not told what that came to. It is well known of course that a successful sugarcane crop pays.

Mr. Fernandez describes the press thus:—The "*kolu* or press is of iron, made in Bombay by a Kachchi iron-master, and has been in use for three years without needing any serious repairs. The pattern has become popular and there are eight such presses in the village. They are hired out at from 12 annas to one rupee per diem and cost in all about Rs. 100 each. The cost in Bombay is Rs. 90. Their advantages over the wooden presses are: (1) they require much less bullock power, (2) turn out ⅓ as much work again, (3) press out more juice from the same quantity of cane and (4) are more durable and far more economical in the end. They work silently, whereas the moans and groans of the wooden press are heard in the dead of night quite half a mile off."

I do not know whether the cultivator appreciates the absence of moans and groans in the dead of night so much as the District Officer!

I give here a table comparing all the sugarcane experiments:—

| Date of Experiment. | Experimenter. | Experiment. | Number of canes. | Weight of | | | Total value of produce. | Percentage of | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Canes. | Juice. | Gol. | | Juice to cane. | Gol to cane. |
| | | | | Lbs. | Lbs. | Lbs. | Rs. | | |
| 3rd February 1891 ... | Mr. Maconochie ... .. | Vánsi ... . | 51,000 | 63,080 | 30,690 | 5,230 | 3·2 | 48·65 | 8·29 |
| 14th and 15th December 1893 ... ... ... | Mr Doderet... ... ... | Mixed Vánsi and Malbári. | 37,240 | 72,400 | 34,090 | 5,712 | 268 | 47·08 | 7·88 |
| 27th January 1895 .. | Mr. Cadell ... ... | Vánsi ... . | 25,080 | 54,976 | 29,341 | 4,945 | 265 | 55·39 | 9·33 |
| 17th November 1895 ... | Mr. Fernandez ... ... | Malbari ... .. | ... | 68,824 | 48,849 | 8,049 | 464 | 70·97 | 11·69 |
| 18th Do. ... | Do. ... ... | Do. ... .. | ... | 81,416 | 56,437 | 9,972 | 495 | 69·32 | 11·02 |
| 28th January 1896 ... | Mr Seddon... ... ... | Vánsi ... ... | 38,640 | 53,885 | 33,000 | 5,538 | 272 | 61·24 | 10·27 |

*Experiment No. 50.*—This is a groundnut test at Jalálpor. The field measures 4 acres 21 gunthas plus 2 gunthas *kharab* for a well and is assessed as Natural Bágáyat at Rs. 53 or Rs. 11-11-5 per acre.

This field has been an absolute puzzle to me. How it was originally assessed I have been totally unable to comprehend, and Mr. Fernandez has told me that he does not understand either. The land was classed as Bágáyat. In column 20 of Village Form No. I is the remark that there is a well rate (*kasar*) on this field. The amount of this rate is not, as usual, shown in column 13. I endeavoured to find out what it was. The information was not available from the Survey authorities. I, however, found an old *Bágáyat Phálavani takta*. This statement says in one place that the *kasar* is Rs. 28 and in another that the land is Natural Bágáyat (*numbero bháthána gaya chhe*). But it was absurd to have *kasar* for a Natural Bágáyat number. For the Natural Bágáyat class was devised simply to get rid of the *kasar* for a particular class of land.

However that does not much matter. The puzzle will have to remain. The field belongs to an Anavla Bráhman who lets it to another Anavla together with some other land. Separate details are not available, but parts of 9 survey numbers whose area is 14 acres 24 gunthas and assessment Rs. 109-2-10 are let for Rs. 159. The superior holder as usual pays the assessment and the Local Fund, so that the profit is only Rs. 43 about.

The field produces sugarcane and groundnut alternately, two crops in three years, with a little castor sometimes planted with the groundnut. The cultivator said the soil was not so good as it once was. I am not at all surprised. Besides the yearly crops there are 13 mango trees and one or two small date palms, also a few plantains.

There was no manure put on for this crop. The field is divided into two halves. One half is manured and then grows sugarcane and the other grows groundnut. Twenty-five to thirty pounds of seed per acre were sown in June. The outturn was 1,846 lbs. of fresh nuts (unhusked) per acre and the incidence of assessment works out to 20·02 per cent. The soil is brown ; the season fair, and anna valuation 14. The outturn is poor. It is for fresh unhusked nuts. I am very much inclined to think that here as in many other cases the formulæ are wrong and badly want revising. The price of fresh unhusked nuts in the Navsari Bazár was Rs. 1-2-8 per Surat maund.

## CHORA'SI TA'LUKA.

Thirty-three experiments were made in this táluka—6 on rice by Mr. Mehta, 5 on *juvár* and 2 on gingelly seed by myself, 2 on *juvár* by Mr. Mollison, 4 on cotton by Mr. Mollison, 6 on garden crops by myself and 8 by Mr. Mollison. With the exception of one experiment by Mr. Mollison on potatoes at Kumbhária in 1894 and one on *vál* by Mr. Nánávati in 1891, no experiments in the táluka have before been recorded. I proceed to analyse the dry-crop experiments beginning with *juvár*.

*Experiment No. 51.*—This is an experiment on *juvár* at Magob, one of the group of garden villages south-east of Surat, of which Kumbhária is the best known. The field measures 8 acres 34 gunthas and is assessed as Jiráyat at Rs. 45 or Rs. 5-1-4 per acre. This is very light assessment compared with the rates at Vijalpor and Jalálpor in the Jalálpor táluka. In my opinion the assessment of this group might very well be raised, and I believe I am correct in stating that this was Mr. Mollison's opinion too. The soil of the field of this experiment is the dark brown rich garden soil. Garden crops could perfectly well be grown in it with irrigation. The only difference there is between the Bágáyat and the Jiráyat soils of this group appears to be due entirely to the larger application of manure to the one than to the other. The soil is undoubtedly a variety of black soil, but is browner and more sticky than the ordinary black soil. It is the finest soil in the district that I have seen. Water is near the surface, abundant and sweet.

The field is Girásia Inám paying a *salámi* of Rs. 32-12. The cultivator is a Rajput. The field is divided into two parts, half belonging to the owner of one bit, who grows cotton and *juvár*, and half to another, who lets it to a cultivator from the neighbouring Sachin State village of Puna, who grows garden crops. A large amount of the Magob land is under garden cultivation, but all the cultivators are Puna men. The seed rate given was 8 lbs. *juvár*, 3⅓ lbs. *tuver*, and ½ lb. each of *mag* and *choli*. The last two came to nothing. Twenty cart-loads of farm-yard manure per acre are said to have been applied. If this be true for last year, it would not be true for every year.

The crop seemed a fairly good one, estimated at 16 annas. It was very tall, but the heads not above the average size. It was a typical crop of its kind *juvár* on good soil manured a little. The outturn per acre was 1,149 lbs. *juvár* and 46 lbs. *tuver*, valued, with byproducts, at Rs. 38-2-5. The incidence of assessment works out to 13·32 per cent. The *juvár* was the yellow variety known as *Pirio*. Its price in the Surat Bazár was Rs. 28 per *gáli* of 30 Surat maunds.

The field is re-classed as Natural Bágáyat at soil 16 and subsoil 4 annas or, with Rs. 6-8 maximum rate, at Rs. 8-2 per acre which is a considerable rise.

The prices of grain upon which my calculations are made, are the prices in the Surat Bazár, at the time, minus octroi and toll charges, *viz.*, *juvár* (*Pirio*) Rs. 27-8 per *gáli* or 42 lbs. per rupee ; *juvár* (*Chapti*) Rs. 29-8 per *gáli* or 39⅛ lbs. per rupee ; *tuver* Rs. 34-8 per *gáli* or 33½ lbs. per rupee. A *gáli*=30 Surat maunds.

*Experiment No. 52.*—This is another very similar field at the same village. Manure rate given was 17 cart-loads per acre and seed rate 8 lbs. *juvár*, 3⅓ lbs. *tuver* and ½ lb. each of *choli* and *mag*. The outturn, estimated as a 14-anna one, was 1,092 lbs. *juvár* and 18 lbs. *tuver* valued, with byproducts, at Rs. 34-12-5 ; the

*juvár* is yellow *Pirio juvár*. The land is Girásia Ját Inám. It measures 14 acres 6 gunthas and is assessed at Rs. 69 as Jiráyat or Rs. 4-14 per acre. It pays a *salámi* of Rs. 53-3. The incidence of assessment is 14·02 per cent.

The land is re-classed as Natural Bágáyat at the same rate as the last experiment, Rs. 8-2 per acre with Rs. 6-8 soil maximum.

*Experiment No. 53.*—The field is at Althán, a village about 3 miles south-west from Surat. The soil is black soil. The field measures 9 acres 17 gunthas and is assessed as Jiráyat at Rs. 47-8 or Rs. 5-0-8 per acre. The outturn, 754 lbs. *juvár* and 14 lbs. *tuver*, is estimated as a 12 or 13-anna crop. No manure was applied, but two years ago some was put on. The seed rates given were 6 lbs. *juvár*, 3 lbs. *tuver*, and ½ lb. *mag* per acre; the *juvár* is yellow *Pirio juvár*. The cultivator is an Anavla Bráhman. The *juvár* appeared to me slightly affected by the short rainfall. The incidence of assessment is 20·29 per cent. Next year's crop will be cotton.

The village is near the salt land and there is some salt in its soil. Water is usually brackish.

One further remark should be made which applies to all *juvár* experiments made on lands near Surat. *Juvár* straw, *kadbi*, is in great demand and sells for an average price of Rs. 2-4* per hundred large bundles. Deducting cartage and tolls I have priced it at Re. 1-14 per hundred. Thus expressed in money the value of the byproduct is about 5 times as much in Surat as in Bárdoli. But to the ordinary cultivator who does not sell it, but uses it all at home, a cart-load of *kadbi* is worth the same whether he lives at Bárdoli or at Surat. The result is that percentage incidences near Surat are too low and near Bárdoli too high.

*Experiment No. 54.*—Another field at Althán measuring 5 acres 8 gunthas and assessed as Jiráyat at Rs. 32-8 or Rs. 6-4 per acre. The soil is *kankari* black soil. It was dressed with 8 cart-loads of manure per acre. *Juvár* (*Pirio*) alone was tested, as the subordinate pulses were failures. Seed rates given were 6⅔ lbs. *juvár*, 3½ lbs. *tuver* and a handful of *mag* and *choli* per acre. Acre outturn of grain was 1,136 lbs. valued, with byproducts, at Rs. 33-13-3, giving an incidence of assessment of 18·47 per cent. which appears high for so good a crop. *Juvár* is grown every year and there is no cotton grown. The owner, a Koli, has only this one field and under these circumstances he finds cotton too risky a crop.

*Experiment No. 55.*—A third field at Althán; area 3 acres 23 gunthas assessed at Rs. 20-8 or Rs. 5-11-9 per acre. This field like the last grows *juvár* every year. The cultivator is a Sutár and this is the only field he has. Subordinate pulses were a practical failure. Seed rates were the same as in the last experiment. No manure is ever applied, because the cultivator has no cattle. The *juvár* is *Pirio juvár* mostly, but mixed. The crop is said to be a 17-anna one for the field. The outturn, however, was very low, 670 lbs. grain per acre, worth, with byproducts, Rs. 20-2-6. The incidence of assessment is very high, 28·45 per cent.

Mr. Mollison has submitted six experiments on dry crops, two on *juvár* and four on cotton.

Of *juvár* Mr. Mollison remarks:—"The crops throughout the táluka are with trivial exceptions very even and are above the average of ordinary years. The season for *juvár* was more than ordinarily favourable, but for *tuver*, which is grown subordinate to *juvár* in almost every field, it was unfavourable. In many fields although the usual amount of *tuver* was sown there is hardly a trace of this pulse. In the field tested (Exp. No. 56) there was a fair sprinkling of dwarfed plants. The usual rotation is cotton and *juvár* but within late years the rotation has been extended in many fields, by the addition of *tal* (sesamum). The oil-seed itself pays in a favourable season and is believed to be a good preparatory crop for either *juvár* or cotton. The black-soil fields in the village are rarely manured, the available supply of manure going chiefly to the rice fields." Mr. Mollison describes *juvar* cultivation thus:—"The field was twice harrowed before the rains and twice ploughed after the soil was sufficiently moistened by rain. The seed was drilled with a two-rowed drill; the rows were 18 inches apart. In different fields the width

* Mr. Mollison only gives Rs. 1-8 for large bundles.

between the rows varies from about 18 to 24 inches. The drill is generally followed by two harrows covering the seed; about 6⅔ lbs. *juvár* and 3⅓ lbs. of *tuver* per acre is the common seed rate. The crop is hand-weeded as soon as the young seedlings are well up, say 15 days after sowing. It is subsequently bullock-hoed twice and thinned out. The most vigorous plants are left about 18 inches apart in the rows. Finally the plough is passed between the row, the effect being to break up the surface and conserve moisture. The date of this operation depends upon the previous rainfall. Usually it is done in September but sometimes in October."

*Experiment No. 56.*—The crop tested was unmanured Sholápuri *juvár*, a straight-headed variety. The outturn, reckoned as an 18-anna crop, was 1,063 lbs. *juvár* plus 36 lbs. *tuver* with 277 bundles *kadbi* valued at Rs. 30-3-8. The soil is black soil assessed at Rs. 6-1-1 per acre and the incidence works out to 20·06 per cent. Mr. Mollison priced *juvár* at 43 lbs. Sholápuri and 41 lbs. Deshi per rupee and *tuver* at 32½ lbs. and *kadbi* at Re. 1 small and Re. 1-8 large bundles per hundred. I think *kadbi* is usually more valuable near Surat. Mr. Mollison neglects the other byproducts as a set-off against the fact that the cultivated area of a field is always less than the assessed area.

*Experiment No. 57.*—Like the last this test was taken at Althán in black soil land. Part of the field is black, part *gorádu* (light). The black soil is unmanured. The *juvár* was Deshi, *Pirio* or *Chapti* not stated. The field was carefully tilled, being remarkably free from weeds. It is assessed at Rs. 6-1-2 per acre. *Juvár* gave 1,070 lbs. grain plus 285 bundles *kadbi* and 30 lbs. *tuver* per acre, and the value of gross produce was Rs. 31-4-5. Incidence works out to 19·41 per cent. Mr. Mollison thinks the best fields in the village might give one-fifth more than these two.

The cultivator of Survey No. 49 (Exp. No. 57) is an Anavla Bráhman. He rents other lands from a Surat Bania—

| Field. | Area. | | Assessment. | | | Rent. |
|---|---|---|---|---|---|---|
| | A. | g. | Rs. | a. | p. | |
| Survey No. 46 (black soil, Exp. No. 62)... | 4 | 35 | 28 | 8 | 0 | Rs. 12 per Bigha (23 gunthas). |
| Survey No. 149 (Gorádu soil) ... ... | 5 | 29 | 46 | 8 | 0 | |

He sublets Survey No. 149 at Rs. 18 per Bigha or Rs. 31 per acre; also rents to the same tenant—

| Field. | Area. | | Assessment. | | | Rent. |
|---|---|---|---|---|---|---|
| | A. | g. | Rs. | a. | p. | |
| Survey No. 148 (Gorádu soil) ... ... | 4 | 16 | 27 | 8 | 0 | Rs. 18 per Bigha. |
| Survey No. 84 (black soil) ... ... ... | 2 | 14 | 13 | 8 | 0 | Rs. 8 per Bigha or Rs. 14-12 per acre. |

The superior holder in all cases pays Government dues. All the fields lie close to the village.

The cultivator's family consists of 16 persons—three of whom work more or less in the fields. He hires three servants by the year, finding them food and clothing and paying them also Rs. 25 per annum. He owns two pairs of bullocks and 15 other cattle, mostly buffaloes.

Of cotton Mr. Mollison took four tests in Chorási. Neither here nor in Olpád did he guard the fields, but is sure that no tampering was tried. I do not myself believe that any cultivator would try to spoil an experiment. They often dislike experiments, but that is because they are sometimes put to loss and

bother by them. I have never detected any attempt to tamper with the produce. Mr. Mollison thinks the cotton crop this year probably a better one than usual and as good as that of 1893-94. He says that the average is much more level in Chorási than Olpád and that the cultivation is better in the former. Cotton boll-worm did a good deal of harm this year and will, Mr. Mollison thinks, continue to do harm so long as seed is bought at the nearest ginning factory. Mr. Mollison mentions the common opinion that in Surat and Broach cotton is the paying crop, and disagrees at any rate in the case of Surat. "The difference in value between an average crop of cotton and an average crop of *juvár* is not as great as is currently believed." I am inclined myself to think that the whole difference vanishes when one allows for the greater riskiness of cotton. Mr. Mollison believes that, taking one season with another, the incidence of assessment on gross value of cotton is well over 20 per cent.

*Experiment No. 58.*—This was taken on cotton at Magob, one of the garden villages south-east of Surat. The soil is brown black. Abundant sweet water is available at a moderate depth. Cotton and *juvár* are sown alternately. Garden cultivation is extending. Mr. Mollison agrees with me that the soil assessment of this group of villages is low and will bear increase. The field bears an assessment of Rs. 6-15-2 per acre. *Juvár* is said to have been manured for the previous year at the rate of 30 cart-loads for 2 acres 15 gunthas. The crop is said to be a 16-anna crop. Gross outturn was 402 lbs. seed cotton valued at Rs. 34-13-9, at Rs. 80 per *bhár* of 24 maunds. Incidence comes to 19·93 per cent. The pickings from 8·9 gunthas were:—

22nd January, 36 lbs.; 8th February, 39 lbs.; 21st February, 14½ lbs.

Mr. Mollison gives a description of cotton cultivation—"The *juvár* stubble, which is generally of considerable length, is removed during the fair season and used as fuel. The harrow is generally used before the rains once or twice; as soon as the soil is moistened a span deep by the first rain, the field is ploughed. It may be further worked with the harrow used once or twice. If necessary the surface is levelled with the *samár* (plank roller). The foregoing operations should be completed as expeditiously as possible, as cotton ought to be sown in June. The seed is drilled through a two-coultered drill, the seed tubes being of larger diameter than an ordinary grain drill. The seed rate varies from 7 to 10 *sers* per Bigha. This is much more than is absolutely necessary, but cotton seed is cheap. Two harrows follow one drill to cover the seed and smooth the surface. The crop is generally intercultured with the bullock-hoe two to four times and hand-weeded once or twice. Interculture begins when the seedlings are about 4 inches high. When they have made some progress the weaklings are thinned out. The rows may be from 18 to 24 inches apart and the plants stand 18 inches or less apart in the rows. Cotton must be kept quite free of weeds or it will not thrive. The plough is passed between the rows in September or October. Cloudy weather during the flowering period and later is very harmful. Many bolls drop to the ground before they ripen. Boll-worm also does much harm. Picking begins in January and lasts in a season of favourable late rainfall on to March and in late crops to April. Picking is done as early in the morning as possible. The mature leaves get dry and crisp, and stick to the lint in the afternoon."

The stalks are not valued in this or any experiment. They are used as fuel or to make *tattis*.

Crops in experiments (Nos. 59 and 60) taken at Althán, Mr. Mollison considers average ones for the greater part of the Chorási táluka. Each crop was estimated locally at the maximum—20 annas. I think this is too high and the proper valuation is 16 or possibly 17.

*Experiment No. 59.*—The field is black soil, all under cotton this year; area 15 acres 2 gunthas assessed at Rs. 88-8 or Rs. 5-14-1 per acre and cultivated by a Kanbi who has in all 110 Bighas of land. The part of the field in which the test was taken grew last year a mixed crop of *val* and castor. Of the Kanbi's land 4 Bighas are rice, 6 arable *gorádu*, 8 *gorádu* under grass and 10 black soil under grass. He owns 6 bullocks, 2 cows, 12 buffaloes, and bought last year 60 loads manure. The rice land and the cultivated *gorádu* gets most

of the manure, but the black soil is also manured to a very fair extent. Ten loads per Bígha were put on before the cotton. The outturn was 394 lbs. seed cotton valued at Rs. 34-1-11, and the incidence 17·23 per cent. Pickings on 9½ gunthas were :—

24th January, 52 lbs.; 11th February, 31 lbs.; 23rd February, 10 lbs.

*Experiment No. 60.*—The next field is also black soil. Its area is 2 acres 25 gunthas and assessment Rs. 15 or Rs. 5-11-5 per acre. Only Rs. 3-12-0 is paid as *salámi*, the field being Inám. Four consecutive crops of *juvár* were taken before this year's cotton. No manure was applied, though it is said to be sometimes given. The field was carefully cultivated. The crop was picked three times and yielded 387 lbs. seed cotton worth Rs. 33-8-11. The incidence of assessment comes to 17·02 per cent. Pickings on 7·8 gunthas were :—

25th January, 26½ lbs.; 11th February, 38 lbs.; 23rd February, 11 lbs.

*Experiment No. 61.*—Black soil in the village of Bhatár, an Inám field. The occupant has about 85 Bighas, of which 7 are grazing and 4 hay-land. He has no rice land, but grows occasionally 2 or 3 Bighas of chillies, which require a good deal of manure. He uses all the manure produced by 6 bullocks, 5 buffaloes, 3 cows and 5 younger animals. He states that the tested field was manured each of the last three years, amounts alleged not given. Mr. Mollison does not believe this, but thinks that the field really is regularly lightly manured, The field is 2 acres 36 gunthas assessed at Rs. 16-8 or Rs. 5-11 per acre. Only Rs. 11-4 *salámi* are paid. The rotation of cotton and *juvár* is practised. The crop is estimated at 18 annas and the gross produce was 348 lbs. seed cotton valued at Rs. 30-2-3. Incidence works out to 18·87 per cent. I am myself inclined to think Mr. Mollison's anna estimate a little high throughout.

The 7 *juvár* experiments show an average outturn of Rs. 30-7-6 per acre and an average incidence of 18·33 per cent. The four cotton experiments show an average outturn of Rs. 32-2-8 per acre and an average incidence of 18·26. per cent. The average outturn and incidence of the rotation are Rs. 31-13-1 and 18·29 per cent. There can be little doubt that, taking one year with another, one-fifth of the produce of dry-crop cultivation is taken for the Government assessment.

*Experiment No. 62.*—An experiment on gingelly seed or sesamum (*tal*). The field is Jiráyat; area 4 acres 35 gunthas; assessment Rs. 28-8 or Rs. 5-13-6 per acre. The crop is a 12-anna one. No manure was put on, but some is applied every two or three years. The rotation is cotton and *juvár*, with gingelly seed occasionally. The crop is not much cultivated in Chorási but fairly extensively in Olpád. It is hardly a paying crop in itself, but is believed to be a useful rotation crop. One pound seed per acre is applied, sown with a two-coultered drill (*phadko*) in the same way as cotton and *juvár*. The seed being very small is frequently mixed with earth before being drilled, in order to prevent its falling too thick. The outturn is 202 lbs. oil-seed per acre valued at Rs. 14-0-7. The price of the seed was Rs. 20 per *háro* of 7½ Surat maunds or 14⅔ lbs. per rupee. Incidence comes to 41·63 per cent. A handful of *tuver* is usually in this district sown with *tal*. In this experiment there were hardly any *tuver* plants to be seen.

It is the custom to pull the plant up and not to cut it with a sickle. The cultivators hold that if the plants are cut, the quantity of oil got from the seed is smaller. The stem would, I suppose, bleed to a certain extent.

The plant is ready to be pulled up as soon as the leaves fall off. The seed pods are still green. Each plant's root is made as free from loose earth as possible, and bundles are made and left in the sun. The pods gradually open and in four or five days the plants are held upside down and shaken, when the seed falls out. This is repeated a few days afterwards for the pods that were still at the first shaking green.

*Experiment No. 63.*—The yield of this field is much better, being 372 lbs. oil-seed worth Rs. 25-13-3. The land is assessed as Bágáyat at Rs. 8-7-8 per acre, and the incidence comes to 32·82 per cent. The land had a slight dressing of 4 cart-loads manure per acre. The land chiefly grows cotton, but it has a well under which chillies and brinjals are grown. By revision survey the land is reclassed as Jiráyat with 12½ annas for soil and nothing for subsoil. At present the

total assessment of the 7 acres 3 gunthas is Rs. 60, of which Rs. 24-6 are for water. Under the revision survey there appears to be no water rate at all. The land being Ját Ináin pays not the full assessment but a *judi* of Rs. 25. It is let by the owner to a Kanbi on an eleven years' lease at Rs. 86 per annum, the superior holder paying *judi* and Local Fund. I was told that a rent of Rs. 90 was paid till lately, but the cultivator threw it up and a new tenant was found at Rs. 86.

The following table shows the particulars of outturn, re-classification, &c., or dry crops :—

| Village. | Field. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|---|
| | | | Rs. a. p. | Rs. a. p. | | | Rs. a. p. |
| Magob ... .. | Survey No. 31 (Exp. No. 51). | Juvár, &c. ... | 38 2 5 | 5 1 4 | 13·32 | Soil ... 16<br>Subsoil . 4 | 8 2 0 |
| Magob ... ... | Survey No. 30 (Exp. No. 52). | Juvár, &c. ... | 34 12 5 | 4 14 0 | 14·02 | Soil ... 16<br>Subsoil . 4 | 8 2 0 |
| Althán ... ... | Survey No. 2 (Exp. No. 53). | Juvár, &c. ... | 24 13 10 | 5 0 8 | 20·29 | Soil ... 14½ | 5 14 3 |
| Althán ... ... | Survey No. 26 (Exp. No. 54). | Juvár, &c. ... | 33 13 3 | 6 4 0 | 18·47 | Soil ... 15½ | 6 4 9 |
| Althán ... ... | Survey No. 14 (Exp No. 55). | Juvár... .. | 20 2 6 | 5 11 9 | 28·45 | Soil ... 14 | 5 11 0 |
| Althán ... ... | Survey No. 19 (Exp. No 56). | Juvár, &c. ... | 30 3 8 | 6 1 1 | 20·06 | Soil ... 14½ | 5 14 3 |
| Althán ... ... | Survey No. 49 (Exp. No. 57). | Juvár, &c. ... | 31 4 5 | 6 1 2 | 19·41 | Soil ... 15 | 6 1 6 |
| Magob ... ... | Survey No. 46 (Exp. No 58). | Cotton ... | 34 13 9 | 6 15 2 | 19·93 | Soil ... 19 | 7 11 6 |
| Althán ... ... | Survey No. 44 (Exp. No. 59). | Cotton ... | 34 1 11 | 5 14 1 | 17·23 | Soil ... 14½ | 5 14 3 |
| Althán ... ... | Survey No. 42 (Exp No. 60). | Cotton .. | 33 8 11 | 5 11 5 | 17·02 | Soil .. 14 | 5 11 0 |
| Bhatár ... .. | Survey No. 119 (Exp. No. 61). | Cotton ... | 30 2 3 | 5 11 0 | 18·87 | Soil ... 15 | 6 1 6 |
| Althán ... ... | Survey No. 46 (Exp. No. 62). | Gingelly seed . | 14 0 7 | 5 13 6 | 41·63 | Soil ... 14½ | 5 14 3 |
| Althán .. ... | Survey No. 34 (Exp. No. 63). | Gingelly seed . | 25 13 3 | 8 7 8 | 32·82 | Soil .. 12½ | 5 1 3 |

The maximum rate taken for Magob, Althán and Bhatár is Rs. 6-8. It is the rate proposed by Mr. Fernandez in his revision settlement proposals. What changes may be made by Mr. Ozanne it is not, at the date of writing, known. The usual small changes will be made for the distance scale. It will be noticed that Magob assessments will be higher, which is right.

Mr. P. R. Mehta, Gujarát Revenue Survey, submits six tests on *Kada* rice taken by him in this táluka. He also gives an account of rice-cultivation in the district, which I shall endeavour to condense after noticing shortly each experiment by itself. Chorási is, as Mr. Mehta observes, not a rice growing táluka. It is unfortunate that the second crops were not tested. I thought I might have time to do them myself, but found it impossible owing to my presence being required in Bárdoli. Of the six fields tested by Mr. Mehta, only two I found to have grown a second crop, in both cases *vál*.

Mr. Mehta gives a table showing the dryage of the rice :—

| Village. | Field. | Weight of 80 *tolas* after drying. |
|---|---|---|
| | | Tolas. |
| Kacholi ... ... | Survey No. 7 (Exp. No. 64) ... | 74 |
| Párdi Rákob .. | Survey No. 5 (Exp. No. 65) ... | 74½ |
| Sámrod ... ... | Survey No. 43 (Exp. No. 66) ... | 76½ |
| Kaphleta... ... | Survey No. 131 (Exp. No. 67) ... | 75 |
| Tabungpor ... | Survey No. 148 (Exp. No. 68) .. | 73 |
| Páli ... ... | Survey No. 41 (Exp. No. 69) ... | 70½ |

His calculations are based on the dry weights thus determined. My own experience shows that the original 80 *tolas* must have been weighed immediately after cutting and threshing. Rice (paddy) does not shrink more than 4 per cent. if the first weighing is made three or four days after threshing. Mr. Mehta has given the weights of the rice straw (*parál*). These are not of much importance, as the straw is never sold by weight but by the hundred bundles or by the cart-load. Mr. Mehta calculates the straw prices at 600 lbs. per rupee. Supposing a bundle to weigh 1½ lb., that gives 4 annas a hundred bundles, which is the rate I myself took. Mr. Mehta only cut 1 guntha bits except in the last test which was on 2 gunthas. So small an area does not give quite trustworthy results.

*Experiment No. 64.*—The first field (Pot number) measures 28 gunthas and is assessed at Rs. 7-10, of which Rs. 1-12 is for tank water, or Rs. 10-14-3 per acre. The tank appears to be very unsatisfactory. This year there was not enough rain to fill it and it was not used, that is to say, its water is not available when most wanted. The soil is black soil as in all Mr. Mehta's experiments. Seed rate was 137 lbs. per acre. Four cart-loads of manure were put in 2½ gunthas of seed-bed and 12 carts in 25½ gunthas into which seedlings were transplanted. Anna valuation is 10. Grain outturn 1,831 lbs. per acre. Value of produce Rs. 41-1 and incidence 26·52 per cent. A second crop of *vál* or gram has been grown six times out of the last nine years, so that the incidence is fairly light.

*Experiment No. 65.*—The second field measuring 4 acres 10 gunthas and assessed at Rs. 20-14 or Rs. 4-14-7 per acre was classed as Jiráyat and has newly (in 1889) been converted into rice land. There is no tank. It has grown a second crop of *vál* six years out of seven. The part of the field in which the experiment was made measures 12 gunthas. Forty sheep were folded in it for 10 days and three cart-loads of manure put on. Seed rate was 150 lbs. per acre, possibly an exaggeration. Outturn of grain was 1,533 lbs. per acre and value of gross produce Rs. 34-9. Incidence comes to 14·21 per cent. It must be remembered that this land has been re-classed as rice, and its assessment will be largely increased. (See table of classification and new rates shown below.)

*Experiment No. 66.*—The third field at Sámrod is also new rice and was assessed as Jiráyat. It also will become rice under the revision survey. It has no tank. It was made into rice in 1891 and has grown a second crop only once since. Thirty cart-loads of manure were applied to 1 acre 38 gunthas. Seed rate is 119 lbs. Grain outturn, 12-anna crop, 1,874 lbs. per acre; gross value of outturn Rs. 42-1-3 and incidence 9·37 per cent.

The next three fields are old rice. The Kaphleta field has no irrigation, the other two (Exp. Nos. 68 and 69) have tank water for which they are both assessed at revision survey as they were at original survey.

*Experiment No. 67.*—The Kaphleta field has grown a second crop of *vál* four times during the last nine years. It had three carts of manure on the seed-bed of 6 gunthas and seven carts on 1 acre 9 gunthas of the rest of the field. Seed rate was 81 lbs. which Mr. Mehta thinks low. Outturn of grain 1,762 lbs. per acre and gross value Rs. 39-15-0. Incidence 21·46 per cent., the assessment being Rs. 8-9-2 per acre.

*Experiment No. 68.*—The next field at Talangpor gave a fine yield of rice, 2,975 lbs grain worth, with straw, Rs. 67-5-10. But the crop is only rated at 14 annas. The Pot number tested measures 6 gunthas. On it 10 *sers san* seed were sown and the plants dug in as green manure. At the end of July the field was top-dressed with one maund of castor cake. *San* seed costs 1¼ maunds per rupee and castor cake annas 8 per maund The *san* was probably produced at home. The crop was not affected by the season owing to the tank protection. Seed rate was 128 lbs. per acre. The acre rate of assessment is Rs. 11-10-8 and the incidence works out to 17·32 per cent. This field has had, as I know, a second crop of *vál* this year. So the incidence must be considered extremely light.

*Experiment No. 69.*—The field at Páli was only 2 gunthas in size and the whole field was cut. The field received only one watering from the tank under which it is. Mr. Mehta says a second watering was needed, but does not say why it was not taken. Presumably there was not sufficient water in the tank. The field has grown *vál* seven times in the last nine years. Two cart-loads of manure were put on the 2 gunthas, and seed rate was 70 lbs. per acre. Grain outturn, estimated as a 12-anna crop, was 2,115 lbs. per acre; total value of crop Rs. 49-5-8 and incidence 25·32 per cent., acre assessment being Rs. 12-8.

I give here a table showing all these six rice fields :—

| Village. | Field. | Gross value of produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey) | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|
| | | Rs. a. p | Rs a p | | | Rs. a. p. |
| Kacholi ... | Survey No. 7 (Exp. No. 64) | 41 1 0 | 10 14 3 | 26·52 | *Soil ... 9<br>Rain water. 7<br>Tank water. 4 | 10 3 0 |
| Párdí Rákeb . | Survey No 5 (Exp No 65) | 34 9 0 | 4 14 7 | 14·21 | Soil ... 15<br>Position ... 2½ | 6 9 0 |
| Sámrod ... | Survey No 43 (Exp. No 66). | 42 1 3 | 3 15 2 | 9·37 | Soil ... 12<br>Position ... 3 | 5 10 0 |
| Kaphleta ... | Survey No. 131 (Exp. No. 67). | 39 15 0 | 8 9 2 | 21·46 | *Soil ... 10<br>Sub-soil ... 4<br>Rain water. 9 | 11 13 0 |
| Talangpor ... | Survey No. 148 (Exp. No 68). | 67 5 10 | 11 10 8 | 17·32 | *Soil ... 9<br>Rain water. 8<br>Tank water. 7 | 12 7 6 |
| Páli ... ... | Survey No 41 (Exp. No. 69.) | 49 5 8 | 12 8 0 | 25·32 | *Soil ... 8<br>Rain water. 8<br>Tank water. 6 | 11 5 0 |

Soil annas on rice lands are doubled for calculation of rates; thus the annas of the items marked with an asterisk are to be doubled. Where the rice soil annas are above 8 it is owing to the second crop. I have adopted the maximum rates, Rs. 6-8 for soil and Rs. 5-8-0 for water, for rice lands in Talangpor and Páli, and Rs. 6 for soil, Rs. 5 for water for rice lands at Kacholi, Párdi Rákeb, Sámrod and Kaphleta. These are the maximum rates proposed by Mr. Fernandez in his revision settlement proposals.

Rice seed is as a rule sown in June in a seed-bed and transplanted into the permanent field about three weeks after sowing. When rain holds off at the time of transplanting, the crop suffers. Four to eight gunthas of seed-bed are required for one acre of land and transplanting takes 20 to 25 men per acre who receive 2 to 2½ annas a day. The seed-bed has to be weeded† as well as the permanent bed. Rice is occasionally drilled in Jirayát fields generally together with *tuver*. When sugarcane is intended to follow, rice is sometimes broadcasted in the permanent bed or *kiári*, as it then matures early and allows of sufficient time to prepare the land for the cane‡. In Párdi§ and Balsár the seedlings are sometimes raised in a rábed bed. But the common practice is for the seed-bed (*taru*) to be simply a portion of the field rather more heavily manured than the rest, in order to force on the seedlings and enable them to be transplanted early. The usual rate of seed for seedlings sufficient to transplant an acre of field is given by Mr. Mehta as 120 lbs. and in my experiments from 90 to 100. There is not the least doubt that the formulæ rate of seed, 30 lbs. per acre, is quite wrong for Surat. In north Gujarát 25 lbs. is sometimes enough. There is a difference both in the rice and in the system of cultivation.

The seed-bed is manured at the rate of one cart-load of farm-yard manure per guntha. When the seedlings are removed, the seed-bed is utilized just the same as any other part of the field. Immediately after the first showers in June the seed is broadcasted. It is then covered up by one or two ploughings. If the seed-bed is hard and foul it may be ploughed before sowing. The manure is spread on in April or May, both on the seed-bed and on the rest of the field (*kiári*). The field is ploughed once or twice in June, and at the time of transplanting the seedlings the operation of puddling (*ghaval* or *kádav pádvo*) is performed. The *kiári* is ploughed while it holds a foot or so of water and is then levelled with an instrument called a *pányu*. There is a traditional saying in the district that *kiáris* should be manured with one cart-load per *vása*‖ or 30 cart-loads an acre. But such a large amount is not usually available. Manure is seldom sold. A cart-load could be bought¶ at Re. 1 to Re. 1-4.

† True for unrábed beds, but, as pointed out elsewhere, rábed beds are not usually weeded.

‡ According to my own experience this is usual only in the south of the district.

§ Párdi being, as is well known geographically a part of the Konkan, the methods of Konkan are, to a large extent, followed there.

‖ 3 *vásas* = 4 gunthas.

¶ Only annas 8 in Bardoli and probably most out of the way places. But the fact is that cultivators buy, if they buy at all, a whole heap, and the actual rate comes to much less than annas 8 per cart-load.

Sheep and goats are often penned in *kiáris* at night, the shepherd getting from annas 4 to annas 6 according to the size of his flock per night. Silt from the bottom of a dried up tank is esteemed highly beneficial. When other manure is not available in sufficient quantities, a green crop of *san* is dug in. *San* seed is sown broadcast and the plants ploughed in about three weeks afterwards, at the time of puddling. The chief drawback to this *san* manuring is that when there is too much rain early the *san* may rot and come to nothing; and if the *san* cannot be ploughed in at the right time, it may grow too tall and ripe to be thoroughly broken up and buried in the soil. The effect of this green manure is thought to last only one year, while farm-yard manure improves two successive crops.

*Khol* or castor cake is often applied as a top dressing a week or two after the seedlings are transplanted if the farm-yard manure was short. It generally costs Re. 1 per 77 lbs. or two maunds.

Fish is used as a manure in Párdi and is applied at the rate of 200 lbs. per acre. It is sold by the basket and comes to 60 to 80 lbs. per rupee. It is generally applied as a top dressing to backward and poor looking crops and is said to produce an excellent effect.

Good *kiáris* will produce 3,000 lbs. of *Kada* rice and perhaps a couple of hundred pounds more of *Kolamb*, *Bangáliu* or *Sukhvel*. A good *kiári* producing 3,000 lbs. *Kada* paddy will bear the following classification annas :—Soil 14 to 16 ; 2nd crop 4 ; rain water 6 to 8 ; tank water 6 to 8.

If it has subsoil water annas as well it probably produces sugarcane once in a three or five years' rotation. The rotation with sugarcane is as follows :—

1st year—Rice, sugarcane (*ummed* or just planted).
2nd year—Sugarcane (*rasida* or ready.)
3rd year—Rice and *vál*.
4th year—Rice and *vál*.
5th year—Rice and sugarcane.

In superior fields of Uttam Bágáyat, sugarcane is grown every other year; sugarcane one year and a mixed crop of rice, *tuver* and other pulses the next. The land naturally has to be heavily manured. Except the fields which were wrongly classed as Natural Bágáyat, *kiáris* fetch a rent of twice the assessment. Such Natural Bágáyat fields fetch 1½ times the assessment.

Mr. Mehta calculates the cost of cultivation per acre as follows:—

| Item. | Amount. | | |
|---|---|---|---|
| | Rs. | a. | p. |
| Manuring 4 to 8 gunthas seed-bed, 3 carts; and 9 carts on the remaining portion at 12 annas a cart ... ... ... ... | 9 | 0 | 0 |
| Ploughing, sowing and levelling seed-bed ... ... ... | 0 | 9 | 0 |
| Cost of seed ; 3 maunds at Re. 1 per maund ... ... ... | 3 | 0 | 0 |
| Ploughing twice the *kiári* in June .... ... ... ... | 1 | 12 | 0 |
| Puddling; ploughing once or twice and levelling (slow heavy work) ... | 3 | 0 | 0 |
| Weeding seed-bed ... ... ... ... ... | 0 | 4 | 0 |
| Transplanting; 20 men at 2½ annas each ... ... ... | 3 | 2 | 0 |
| Top dressing with castor cake ; 5 maunds ; Re. 1 per two maunds and 8 men to apply it ... ... ... ... ... ... | 3 | 8 | 0 |
| Weeding *kiári*; ten men ... ... ... ... ... | 1 | 4 | 0 |
| Cutting, carrying, beating out paddy and cleaning it; 25 men at 2½ annas each ... ... ... ... ... ... | 3 | 14 | 6 |
| Treading *parál* to make *puju** and to secure any remaining grain; 4 men and 4 bullocks for 3 days at 2½ annas each ... ... ... | 3 | 6 | 0 |
| | 32 | 11 | 6 |
| Add assessment Rs. 15 ... ... ... ... ... | 15 | 0 | 0 |
| Total cost ... | 47 | 11 | 6 |
| Produce 3,000 lbs. *Kada* at 12 annas a maund plus straw (at Rs. 5) ... | 63 | 8 | 0 |
| Net profit ... | 15 | 12 | 6 |

* The substance which results from the treading of the straw is called *puju*.

There are of course certain obvious criticisms on this scale of charges. Manure costs nothing as a rule, being the produce of milch animals whose keep is more than paid for by the sale of *ghi*. A good deal of the labour is home labour. It ought not to cost Rs. 3-14-6 to gather in the crop. The last operation is not necessary and would not be undertaken unless it could be done much cheaper than Rs. 3-6. For 3,000 lbs. grain would correspond to 3,000 lbs. straw, which is worth, according to Mr. Mehta, Rs. 5 and this is all the value Mr. Mehta allows it after Rs. 3-6 has been spent on it. On the other hand, all fields certainly do not produce 3,000 lbs. grain. Again, there would almost certainly be a second crop which costs hardly anything in such a field as Mr. Mehta supposes.

I turn now to the garden tests taken by Mr. Mollison and myself. Except three experiments on sugarcane at Adájan all the tests were taken at the garden villages of the Kumbhária group—Kumbhária itself or Magob.

*Experiment No. 70.*—An experiment on *Surti Meva* sugarcane at Kumbhária. The soil is the brown garden soil of this group. The well is an old two-bag well irrigating only this field which measures 2 acres 22 gunthas and is assessed at Rs. 43, which includes Rs 18 for the well. This year the field has about one acre sugarcane and 1½ acre fallow and to be used for onions. Sugarcane was grown last in 1891-92. Other garden crops are taken. The cultivator is a Kanbi. He says he put on 50 cart-loads manure per acre. About 9,360 pieces of cane were planted. There were 12 to each bed or *kiári* and in one guntha there were 19½ *kiáris*. The crop was planted in February and cut in the following January. This variety of cane is used solely for eating purposes and I shall have more to say about it when dealing with Exp. No. 72. The outturn from one guntha was 940 canes. I estimate their value at Rs. 5 or Rs. 200 per acre, which brings the incidence to 8·43 per cent. The crop was sold, it is about one acre as I have said, to a Koli for, according to the Koli's statement, Rs. 100. The Koli put the price of the lot I cut at Rs. 6 and he would get Rs. 4-8 as he would have to pay 25 per cent. to the broker who sold. The crop was estimated as a 12-anna one. It was not a good one. There were no canes of the first or second class (see Exp. No. 72). There were 240 of the third, 240 of the fourth, 260 of the fifth, 200 of the sixth and a small amount of broken and undersized canes.

*Experiment No. 71.*—A similar but better crop at Magob, a neighbouring village. The field measures 9 acres 12 gunthas, of which two gunthas are *kharib* for the well. It is assessed at Rs. 118-8, of which Rs. 66 are for the water, or Rs. 12-13 per acre. It will be seen that about Rs. 6 is for soil and the rest for the well. The field is sublet to four cultivators. Garden produce of all sorts is grown. The cultivators come from the neighbouring Sachin village of Puna. The well is a large one and supplies sweet water plentifully. The water appears to have a fertilizing effect itself; there is probably iron in it.

Of the whole field two pieces, about 2 acres in all, were under sugarcane. The two pieces belonged to two different men. The piece from which I cut one guntha belonged to one Haribhái Ragha, who sold the crop about a month ago to a Dhed for, I was told, Rs. 210. This piece I measured and found it ½ guntha less than one acre. If the figure Rs. 210 can be trusted—such figures are usually below the true amounts—the purchaser must have made a good bargain. The outturn was 47,360 canes an acre valued at Rs. 296. Among the canes were the finest canes of the first class.

Fifty cart-loads of manure per Bigha (23 gunthas) are said to have been applied. The crop is estimated as an average one. The seed rate was 7,200 pieces of cane per acre. Twelve pieces of cane, each about 10 inches long, were put in each square (*kiári*) and there were 15 *kiáris* per guntha.

I did not classify the canes in this bit. The canes were valued at 10 per anna, which is about the average. There is no byproduct worth considering. The dried leaves which are stripped off are used for thatching.

*Experiment No. 72.*—An experiment on sugarcane on the Bháta lands on the river Tápti opposite Surat in the village of Adajan. There is a fringe of this Bháta land along the northern bank of the river. It is very fine alluvial soil. Without irrigation it grows such crops as brinjals, chillies, &c. When not growing garden crops proper, these alluvial soils grow fine mixed crops of *juvár*, *vál*, *tuver*,

*guvár*, &c. The *vál* is especially fine and is chiefly eaten as a fresh vegetable, resembling, more closely than anything else I have tasted, French beans. There are country mangoes in many fields, and date trees in almost all, the latter being tapped for toddy which is largely produced on the north bank of the Tápti. The *ber* or *bor* tree is also common, its fruit being sold at a cheap rate in the Bazár. Unfortunately no other crop but sugarcane can be tested, because an experimenter cannot supervise operations which last for several months. I think it is quite possible that graft mangoes would grow. The Patel told me that there is one garden of them. With irrigation this soil would grow anything. Unfortunately, the water is never sweet. It is sometimes brackish and sometimes salt. There is a great difference between fields with salt and fields with brackish water, and there undoubtedly ought to be a great difference in their classification and assessment. The depth of the water matters very little. It varies considerably at different times of the year and according to the year's rainfall. The assessment on all these fields is very high, for instance, over Rs. 18½ per acre on the field of the experiment. That is to say it is rated much higher than the garden soils of Kumbhária, while the superior productiveness of the latter is, according to my experience, decided, owing to its water.

The field measures 2 acres 12 gunthas. I tested a bit in Pot No. 2 which measures 25 gunthas and is assessed at Rs. 11-10 or Rs. 18-9-7 per acre. Thirty-two cart-loads of farm-yard manure were put on per acre. Seed rate was 9,000 pieces of cane per acre planted in March. Outturn from the one guntha of my test was 983 canes, or 39,320 per acre valued at Rs. 191-1-7. The crop was irrigated from a *kachha* well. Water (brackish) is found about 20 feet below the surface, and it is the practice to dig *kachha* wells. These *kachha* wells frequently fall in, especially in years of heavy rainfall. They cost about Rs. 15 to dig. But occasionally several wells have to be dug before a successful and strong one is got. In this field the first well was successful and besides irrigating the crop of the Pot number tested, it supplies water to the sugarcane of Pot No. 1 (area 21 gunthas) and that planted in Survey No. 13 (area 1 acre 7 gunthas), in all 2 acres 13 gunthas of sugarcane.

The field, Pot number 2, area 25 gunthas, belongs to a Boráh who lets it to a Kanbi for Rs. 20 or Rs. 32 per acre, the owner paying the assessment and Local Fund. When the sugarcane crop was nearly ready it was sold by the Kanbi to another Kanbi for, they say, Rs. 100. This second Kanbi sells the canes in Surat and Ránder, and I shall show presently how they are sold, and the method I have adopted in calculating the value of the outturn. I may remark here that it would be much better if we could find out what the crop is worth to the cultivator. But then I put little trust in the cultivator's statements while I can find out more or less correctly the retail price of the produce. The buyer, the second Kanbi, cuts the cane as he wants it. He cuts about ⅓ guntha before sunrise and takes it to the Ránder or Surat Bazár.

The cane is known as *Meva* or fresh fruit. It is a thin soft white variety. It is all eaten fresh. *Gol* is not made from it. No *gol*-making cane is grown near Surat; probably fruit cane pays better. The seed canes are brought from the villages of Kumbhária, Puna, &c. They are planted in February or March in dry beds. Only the finer canes are used for seed. Immediately after planting, the field is watered and the crop should be irrigated about once a week in the dry weather and when the rains hold off in the monsoon. It is probably generally irrigated less. This crop was watered four times after the monsoon and before being cut. It has to be twice weeded; once when the plants are about a foot and once when they are 2 to 3 feet high. It should be protected from jackals, which are extremely numerous near Surat. Both jackals and rats (field shrews) do a great deal of harm. Jackals bite through and suck the cane, choosing the finest ones, about a foot from the ground.

In the Bazár there are seven classes of eating cane, the quality depending upon the fineness and thickness of the cane. Their names and prices are as follows:—

| | | | | | |
|---|---|---|---|---|---|
| I Charat | at 3 canes | per anna | or | Rs. 2-0-0 | per 100. |
| II Pardi | at 4 | do. | or | „ 1-8-0 | „ |
| III Bábrel | at 5 | do. | or | „ 1-4-0 | „ |

IV Kátro at 7 canes per anna or Re. 0-15-0 per 100.
V Tol at 10 do. or „ 0-10-6 „
VI Avval at ¾ pie each or „ 0- 6-0 „
VII Duum at ½ pie each or 3 canes per pie or Re. 0-3-0 per 100.

The field of this experiment produced neither *Charat* nor *Pardi*. The absence of *Pardi* made the crop only a 12-anna one. *Charat* is never produced here but only at Kumbhária. In the guntha I cut there were 63 *Bábrel*, 111 *Kátro*, 200 *Tol*, 264 *Avval* and 345 *Duum* canes. The price of the crop I have calculated on the rates per hundred. According to the retail prices the values are Rs. 4-15-2 for the guntha and Rs. 197-14-8 for the acre.

The rates quoted were given me by a Pársi who bought the crop of the next experiment. He had no motive, but rather the reverse, for giving me rates higher than those actually obtained, and I imagine his rates are correct, at least for Ránder. The Mámlatdár gave me lower rates, *viz.*, Re. 1-8, Re. 1-2, annas 15, annas 9, annas 7½, annas 4½ and annas 2¼ respectively per hundred; and my private butler found these rates:—Re. 1-8, Re. 1-4, Re. 1-2, annas 12, annas 8, annas 6, annas 4.

The byproduct I have not valued. It consists of the dry leaves stripped off and may be used for thatching. The tops are not cut off, but the canes are sold with the tops. The incidence of assessment comes to 9·73 per cent., which appears to me very high for such a crop as sugarcane.

*Experiment No. 73.*—This was a crop and a field very much like the last. The Pot number measures 25 gunthas and is assessed at Rs. 11-12 or Rs. 18-12-10 per acre. It is Bháta Bágáyat like the last, and is also irrigated from a *kachha* well. It grows exactly the same classes of crops. The owner of the field is a Koli. He says he bought the field 15 years ago for Rs. 125 about 10 times the assessment. He has sold the sugarcane crop for Rs. 100 to a Ránder Pársi. I took two days to cut one guntha, cutting half on 6th and half on 10th December. The field besides its crop of sugarcane has 8 mango trees, 4 large date palms (*khajuri*) and 50 young ones; also two *ber* trees. The water applied to the sugarcane has a very beneficial effect upon the young trees. The treatment of the crop was the same as in the case of the last experiment. Forty-eight cart-loads of manure per acre were put on and the seed rate was 9,000 pieces per acre. The guntha produced 816 canes: 37 *Pardi*, 141 *Bábrel*, 146 *Kátro*, 180 *Tol*, 177 *Avval*, and 135 below class, probably the same as *Duum*. The crop was as a 14-anna crop and its value, calculated as in the last experiment, was Rs. 227-8; incidence coming to 8·26 per cent.

The cane was damaged a little by rats and jackals and was affected by a kind of blight called *másí*. The blight consists of a black sooty deposit round the joints of the canes and a number of small grey spots on the leaves. It does not appear to matter much.

*Experiment No. 74.*—A Meva sugarcane experiment by Mr. Mollison at Adájan, similar to the last two, on the alluvial soil "old Bháta land, a very fine description of *gorádu* soil. The land is now only liable to be submerged in years of exceptional floods. The subsoil water throughout the greater part of the garden tract is salt and unsuitable for irrigation, but there is a well defined portion near the river where the water is only brackish, and here irrigated crops are grown The test field was selected in this area. The water generally gets almost salt in the hot season, and irrigated crops are not continuously grown. Sugarcane is generally taken once in five years. The succeeding year a dry crop is grown, generally it is *juvár* with a subordinate mixture of *tuver*, castor, *guvár* (Cyanopsis psoraliodes) and *vál*. The outturn of the mixed crop is much more certain and much greater than that of any crop in ordinary black dry crop soil. Other crops in the rotation are brinjals, tobacco, castor alone, *turia* (Luffa acutangula), and *chibdi* (Cucumis sativus), the two former generally assisted by light irrigation, the three latter as dry crops. A good many numbers grow grass and *khajuri* trees (*toddy palms). Numerous plantations are now being formed

* Not toddy palms but country-date palms. Mr. Mollison errs as the Brab is usually called the toddy palms.

the land between the trees is cultivated with crops named above until the trees are old enough to be tapped."

The field tested measures 1 acre 6 gunthas and is assessed at Rs. 20-8 or Rs. 17-13-3 per acre. *San* was ploughed in as green manure. The land was ploughed and worked ; *chibdi* seed was sown but failed. Fifty cart-loads of farm-yard manure were applied to the field, and the land was again worked and made into beds about 600 to the acre. *Sixteen sets were planted in each bed. A *pakka* well irrigates the field ; depth to surface of water 27 feet. The field was thickly planted with *khajuri* trees—2 years old.

Mr. Mollison only cut half a guntha, but thinks that the results may be accepted as fairly average for the whole crop if it had been all cut on the same day. The crop was fairly even. The outturn from the piece cut was :—

| | | | | | |
|---|---|---|---|---|---|
| 42 | Pardi | at 64 | per rupee | or Rs. 1- 9-0 | per hundred. |
| 85 | Bábrel | at 80 | ,, ,, | or Rs. 1- 4-0 | per hundred. |
| 225 | Kátro | at 112 | ,, ,, | or Rs. 0-14-3 | per hundred. |
| 96 | Tol | at 160 | ,, ,, | or Rs. 0-10-0 | per hundred. |

and about 100 odd pieces priced at Re. 0-5-10, the total coming to Rs 3-12-10 Total number of canes 26,188 and 7,550 odd pieces per acre valued at Rs. 286-4-7. Incidence works out to 6·23 per cent. The prices given by Mr. Mollison are almost exactly the same as those quoted by me. They are wholesale rates.

Mr. Mollison is of opinion, judging from the general appearance of the crops both this year and the last, that the assessment on this land is moderate. But he would " draw a sharp line of distinction between the numbers which have brackish subsoil water and numbers which have absolutely salt water. There is ample evidence that the water over a large area is absolutely salt, because wells have been dug and are not used, and the villagers know or think they know where there is a certainty of getting water suitable (brackish) and unsuitable (salt) for irrigation."

*Experiment No. 75.*—An experiment on groundnut at Kumbhária. The outturn, 1,206 lbs. per acre of fresh unshelled nuts, is extremely poor ; it is not clear why. It is estimated as a 10-anna crop. The field measures 2 acres 35 gunthas plus 1 guntha well *kharáb*, assessed at Rs. 37, of which Rs. 14-13 are for the well, or Rs. 12-13-11 per acre. It grows all sorts of garden crops and fruit trees The land is said to have been manured with 40 cart-loads of manure per acre. This can hardly be true. Seed rate was 120 lbs. per acre which is three times the formulæ rate and is probably an exaggeration. I have estimated the haulms as worth 3 annas per guntha, and the price of fresh nuts was Rs. 1-8 per Surat maund. Dried nuts fetch Rs. 2-8 per maund. The value of the total produce comes to Rs. 55-2-7 and the incidence to the high figure of 23·32 per cent. Groundnut was sown three years running.

*Experiment No. 76.*—A groundnut test at the same village by Mr. Mollison The field, 2 acres 37 gunthas, assessed at Rs. 15-8 or Rs. 5-4-9 per acre, was classed as Jiráyát. One acre is under irrigation. In 1891-92 and 1892-93 *juvár* was grown and the last two years groundnut. The cultivator gets water from a neighbour's well and pays Rs. 10 per annum for it. Manure, at the rate of 30 loads per acre bought in another village at Re. 1 per load, was applied according to the occupant, but there was not much evidence of a heavy dressing, and the field was not " cultivated with the care usually bestowed on garden crops. The beds were irregularly formed and far too large for economical watering." Water was given six times. The seed was sown by hand behind the plough in June-July at the high rate of 75 lbs. per acre. Had the seed been planted by hand in pits about a foot apart, as is commonly done in the district, much less seed would have been required. Mr. Mollison allows Rs. 2 per acre for the fodder. The haulms were dead ripe. Still I think the fodder is worth more. The crop was hand-dug with a light pick ; expense estimated at Rs. 20 per acre, perhaps too high a rate. This digging is a capital preparation for the next crop. The nuts (in shell but dried) were 1,620 lbs. per acre †worth, with the byproduct, Rs. 75-11-4. The

* It may be noticed that the formulæ rate of 20,000 sets per acre is undoubtedly wrong for this veriety of cane. 9,000 to 10,000 is the rate.

† Price Re. 1-12 per maund or Re. 1 to Re. 1-4 newly lifted. A lower rate than that taken by myself.

incidence of assessment comes to 6·99 per cent. and the margin of profit small. Mr. Mollison observes that the owner is bringing his land into condition to grow much more valuable garden crops, and elsewhere he remarks on the custom of taking several groundnut crops in succession.

*Experiment No. 77.*—This is an experiment on cabbages by myself. The field measures 7 acres 7 gunthas and the Pot number experimented on 1 acre 31 gunthas assessed at Rs. 21-10 or Rs. 12-2-11 per acre. Of the Rs. 21-10 Rs. 13 are for the well. The soil classification was only 12 annas at the original survey—actual rate Rs. 4-13-9. It has been re-classed at 19 annas for soil plus 4 annas for subsoil.

The field grows all sorts of garden crops. Cabbages are found to pay very well. The variety is a coarse medium-sized one, no doubt very hardy. The seed is got from Bombay at Rs. 5-4 per 4-oz. packet, a very dear rate. The 4 ozs. of seed was put in one guntha of seed-bed, and produced cabbages sufficient to plant out one acre. The seed was sown in August. The one guntha was hired in another field for Rs. 5. Three-fourth load of farm-yard manure and 1¾ maunds of castor-oil cake costing 12 annas to Re. 1 were put on the seed-bed. When large enough for transplanting, the cabbages are planted out in little beds (*kiáris*). In each bed 18 to 20 plants are put, and there are 15 beds to the guntha. The cabbages have to be watered every 6 days in default of rain. They have to be weeded two or three times, an easy task with a crop of this sort. Between fifty and sixty cart-loads of manure at Re. 1-4 per load were applied to the acre under cabbages, apart from the seed-bed. The water is obtained from a fine 4-bag well. The well supplies three bags with ease and four with a little care. This cabbage crop was cut in the first half of December, and very high prices were got. Of this more later on. All these cabbages were sent to Bombay. The cultivator is one Bhága Lalu, a Kanbi of Puna. Almost all the Magob garden cultivators are strangers from Puna. Nevertheless the village of Puna is heavily in debt to the Ghánchis of Surat; the village debt is estimated at from one to three *lákhs*. Bhága Lalu is in the hands of a Surat Ghánchi named Motia Arji, and Motia Arji has an agent or partner, a fellow Ghánchi, in Bombay.

The cabbages are cut in the morning. They are packed in baskets measuring about 18 inches deep by 2 to 2½ feet broad. In each basket about 6 ordinary-sized cabbages are put. The baskets are got from Surat and cost about one anna each. Bhága Lalu thinks he did a smart thing by getting 18 for a rupee. The morning I was on the field 40 baskets were ready for despatch. They were sent in a cart to Surat and went to Bombay by the midday passenger train. They get to Bombay by nightfall. The railway freight is about 3½ annas per basket, and cooly hire at Surat one pie per basket. They are taken to the station by the cultivator and are despatched by him to the address of the Bombay agent, and the Surat coolies get paid by sending in a bill to the Surat Ghánchi. When the cabbages have arrived at Bombay they are met by the Bombay agent, who pays freight and other expenses and sells the cabbages by auction to the retail dealers in the market. The Bombay agent then writes to the Surat Ghánchi saying that the cabbages were sold for so much and expenses are so much. The Surat Ghánchi credits the cultivator with the excess of sale-proceeds over expenses and commission in his books. The account of the cultivator with the Ghánchi is squared at the Diváli. As the cultivator keeps no accounts himself and as he knows nothing whatever about the price of cabbages in Bombay, one can very well imagine that he and all his tribe are, well, a little involved.

There is some little difficulty about the price. What is the value of a basket of cabbages? The price varies enormously. Mr. Mollison in his experiment (*vide* next test) allows ½ anna per cabbage. But his cabbages came on in February, whereas the present ones were more than two months earlier and the price obtained was at least twice as large. What the cultivator likes to do is to get his crop ready early. What frequently happens is that the seedlings for his early crop are eaten by caterpillars. I made careful inquiries as to the price realized by the cultivator of the present crop, and I put it at 8 annas per basket.

The Ghánchi allows 10 annas in his books* not after paying freight and commission. The price of a basket is one anna and the price of cartage to Surat Station and cooly hire nearly one anna. Using another method of calculation, the price in the Bombay market was Re. 1-4 per Surat maund. Each basket weighs ¾ Surat maund. Freight to Bombay is about 3 annas at 8 annas per Bengal maund, which is about 2½ to 3 baskets. The Ghánchi's commission is one anna in the rupee. There are cartage and cooly expenses in Bombay. If anything, 8 annas is under the mark Calculated at 8 annas per basket of 6 cabbages the value per acre comes to Rs. 829-4-3 and the incidence of the assessment to 1·47 per cent.

*Experiment No. 78.*—Mr. Mollison took a test on the same crop (cabbages), The crop was planted in November—15 plants in each bed. There were approximately 809 beds per acre; therefore about 12,000 plants were required per acre. In 18 beds measuring 0·89 of a guntha there were a few vacancies and a few cabbages which had not grown so well as the others. There were 258 well-developed cabbages, equal to 11,600 per acre. The crop was even all over the field and there was no doubt that the cultivator would sell at least 11,600 of them per acre. Twelve ripe and average-sized cabbages (hearts only) weighed 55 lbs. The retail price of such cabbages was one anna each in Surat at the time and wholesale half an anna. Half an anna is the rate Mr. Mollison has taken, 3 maunds per rupee. Calculated at this rate the crop was worth Rs. 362-6 per acre and the incidence of assessment comes to 3·53 per cent. The crop was gathered late in February, and its value was of course much less than it would have been earlier in the season. The crop is estimated as a 16-anna one. Eighty loads cattle dung per acre are said to have been put on the land; but Mr. Mollison thinks this probably an exaggeration. Half a pound of seed costing Rs. 10 gives seedlings sufficient for 1¼ acre. The field was fallowed during the monsoon, being well ploughed and manured. The occupant admitted that generally cabbages are a very profitable crop, more so than the other irrigated crops he grows. He complained about the price of seed.

*Experiment No. 79.*—An experiment on yams at Magob. The field measures 3 acres 2 gunthas and is assessed at Rs. 27, of which Rs. 12 are for a well, or Rs. 8-13-8 per acre. There are three varieties of yam or *ratálu* in the district: *Bhusra*, a long variety of nearly equal diameter throughout with red skin and pure white flesh; *Talabdi*, a spindle-shaped red-skinned variety with red-tinged flesh, reckoned a superior sort and sold at Rs. 12 to Rs. 13 a *khandi* of 20 maunds, while *Bhusra* sells at only Rs. 8; *Kamodia*, round, white and of good flavour, if any of these things can be said to have a good flavour.

The area under test, about ¾ acre, has been sublet to a Kanbi for a term of 20 years, 12 of which have run. The owner pays assessment and gives the use of the well. The tenant paid down a lump sum of Rs. 175 for the right of occupancy for 20 years Apparently there is no other payment, though this rent is very little more than the assessment, and cannot, I think, be correct.

The soil of the area tested has been changed by a long course of manuring and irrigation, but is naturally the same as the dry crop land of the village. For some unexplained reason the land had become stocked with *chido*, a sedge and a troublesome weed in irrigated land. So it was fallowed and hand-dug in 1894-95. The *chido* is not yet eradicated and unfavourably affected the crop tested. Yams, however, Mr. Mollison observes, would be less seriously affected than perhaps any other crop, and the deep digging required for the harvesting of this crop would more or less kill the *chido*. Mr. Mollison gives the cost of

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* Translation of extract from the Ghánchi's ledger :—

Page 35.

Bhága Lalu of Punna's account, Samvat 1951 :

| | | | | |
|---|---|---|---|---|
| Rs. | 2-7 | Kártak | Sud | 7—2 baskets cabbages. |
| ,, | 1-6 | ,, | ,, | 8—2 baskets cabbages. |
| ,, | 2-6 | ,, | ,, | 11—3 baskets cabbages. |
| ,, | 8-6 | ,, | Vad | 2—16 baskets cabbages. |
| ,, | 11-8 | ,, | ,, | 7—16 baskets cabbages. |
| ,, | 15-5 | ,, | ,, | 12—26 baskets cabbages. |

digging yams out at Rs. 5 for moist soil. The field was hand-dug the previous year and well ploughed in June and is said to have been manured at the rate of 46 cart-loads per acre of cowdung, costing Re. 1-4 per load After harrowing and levelling the soil was turned up into rounded ridges 4 feet wide and extending the whole length of the field. The irrigation water flowed along the shallow furrows between the ridges. The sets consist of segments of a yam, each set being about ⅓ lb in weight. They were planted about 2 feet apart on the ridges, and about 5,440 sets or, say, 1,800 lbs. are required to plant an acre. The owner said he planted 32 maunds at Rs. 35 for the area tested. It is difficult, as Mr Mollison says, to reconcile the dear rate paid for the seed with the cheap rate at which the produce is valued. It is not always, I should think, necessary to buy seed at this dear rate.

The crop was watered only a few times during the breaks in the rains and at intervals of 12 days after the rains ceased.

The tested area Mr. Mollison considers inferior to the average, but until the vegetable is dug up no one knows how it will yield. The acre yield was 8,061 lbs. valued at Rs. 104-12-8. Wholesale price of this variety 8 annas per maund. Incidence works out to 8·45 per cent. Had the crop been anything like a good one, the incidence would have been much lower. As it is, it is high. If we believe the rates for manure and seed given, the margin of profit is nil.

*Experiment No. 80.*—This experiment was taken on mixed turmeric and yams (*talabdi ratálu*). The field measures 5 acres 35 gunthas plus 3 gunthas *kharáb*. Its assessment is Rs. 33-8-0 for soil and Rs. 44 for water or together Rs. 13-3-1 per acre The well supplies only sufficient water for half the field, the other half growing dry crops. The irrigated half showed signs of careful cultivation and liberal treatment. This year it was entirely under the tested crops. In 1894-95 it grew groundnut; in 1893-94 chillies, garlic and *dudhi* (Lagenaria vulgaris). Mr. Mollison doubts whether the cultivator is quite exact when he says that 150 loads of manure costing Rs. 150 were applied to 1¾ acres. The harvesting of the last year's groundnut crop left the soil dug up and thoroughly exposed to the weather during the hot season. In May manure was applied and the land repeatedly ploughed, and laid out with great exactness into beds; 720 per acre. Six sets of yams were planted on the borders of each bed; 4,320 sets, each weighing ¼ to ½ lb. per acre. Inside turmeric was planted; 2,340 lbs. to the acre. Each set was planted in a shallow pit and carefully covered—the sets being about a span apart. The crop was said to have been watered 3 times before the rains, 7 times during them, and 11 times afterwards. It was dead ripe on 21st January.

Both turmeric and yams are sold at once uncleaned, and including the old sets. Turmeric fetched Rs. 7 per *khandi* of 20 maunds and *talabdi* yams Rs. 11-8. Cleaned turmeric fetched Rs. 10-8 to Rs. 11, and weighs by test $\frac{11}{16}$ of the weight of the uncleaned article. The largest yams weigh 7 to 8 lbs. each. Total outturn was 13,570 lbs. turmeric worth Rs. 123-7-9 and 6,020 lbs. yams worth Rs. 90, in all Rs. 213-7-9 per acre. Incidence comes to 6·17 per cent.

*Experiment No. 81.*—An experiment similar to the last. The field measures 9 acres 10 gunthas net and is assessed at Rs. 52-8 for soil and Rs. 66 for water, together Rs. 12-13 per acre. It is Inám and the Inámdár pays a quit-rent of Rs. 27-8 and Rs. 7-6-6 Local Fund. He has sublet the number at Rs. 15 per Bigha, or, say, Rs. 26 per acre, to three partners who have cultivated the land on the above terms for the last 12 years. About 8¾ acres are under irrigation from a three-bag well. The cultivation of the field is described as almost faultless. "A large variety of irrigated crops are grown in quick succession, often two crops equally valuable in one year. During the last four years sugarcane, turmeric and yams, cabbages, garlic, onions, groundnut, chillies, ginger and *suran*, (Amorphophallus campanulatus) have been grown in different portions of the number and more or less rotated with each other. The area under experiment grew turmeric and yams in 1893-94 and sugarcane in 1894-95. In this field about 2,140 lbs. of turmeric and about 5,700 yam sets were planted per

acre in May. The crop was watered twice before the rains and ten times afterwards. There was evidence that a heavy application of manure had been given, but it is not likely that the dressing was as heavy as that reported, *viz.*, 125 loads per acre, costing Re. 1 per load in Surat. Half of the turmeric and yam area had been harvested early, and a second crop of onions, which promised remarkably well, had been planted. The tested crop was dead ripe on 22nd February." The outturn was 14,842 lbs. turmeric and 9,014 lbs. yams per acre worth Rs. 269-13-2 together. Incidence comes to 4·74 per cent. Both these last crops are estimated at 16 annas.

*Experiment No. 82.*—White onions on garden land at Kumbhária. The field measures 30 gunthas and is assessed at Rs. 6-8 for soil. A well irrigates this field and another measuring 1 acre 18 gunthas and assessed for soil at Rs. 12-1. The well *kasar* is Rs. 40-15. The two fields therefore have Rs. 18-9 for soil for 2 acres 8 gunthas plus Rs. 40-15 for the well or an average of Rs. 27-0-9 per acre for soil and water combined. This is astonishingly and unusually heavy and the well must be capable of irrigating much more land. Mr. Mollison says the occupant "is almost an imbecile but nevertheless not a bad cultivator."

The onions followed a rain crop of *kohlu* (Cucurbita pepo). The *kohlu* was manured with 46 loads of manure per acre. No manure was applied directly to the onions. For four years previously groundnut has been grown. The variety of onion is known as *Dhola* (white). Mr. Mollison proceeds:—"Whole small onions were planted, and each of these either grew into a large single bulb, or, by sub-division, into several medium-sized bulbs. About 1,000 lbs. of small dry bulbs are sufficient to plant an acre. The field was laid out carefully before planting into beds. Small pits were dug in the bed about 6 inches apart. The single small bulbs were planted, one in each pit and carefully covered. Onions planted in this manner would, in due course, if left alone, produce seed, but all flower stalks were removed; therefore as the crop ripened, bulbs were produced. *Dhola* onions, unlike ordinary onions, are lifted comparatively green. Each onion has when lifted a coarse neck and a good deal of green top. The onions are lifted with a small pick. The tops are cut off close to the bulb and are left in the field to rot, having no saleable value." A sample of the onions lost 25 per cent. in weight in 11 days. The field yielded at the rate of 11,836 lbs. dry bulbs per acre, at the wholesale rate of 9 annas per maund, worth Rs. 173-1-7. Incidence works out to 15·62 per cent.

*Experiment No. 83.*—Sweet potatoes on a light-coloured free working loam (*gorát*). Mr. Mollison says the field is Natural Bágáyat. Its area is 2 acres 35 gunthas and assessment for soil Rs. 22-3 and for water* Rs. 14-13 or together Rs. 12-13-11 per acre. About one acre is uneven waste growing grass and mango trees, not necessarily unprofitable. Before digging the crop appeared good, but was found to be only middling or 14 annas. The land was formed into beds, 12 feet by 6 feet and 24 cuttings were put into each bed (see Exp. No. 25). Manure at the rate of 46 cart-loads per acre was first applied. The crop was irrigated from a well 12 times. The harvesting operation is difficult. Mr. Mollison says that it costs Rs. 20† per acre. He has given this rate for groundnut which is much easier to dig, as the nuts are much closer to the surface than the sweet potato tubers, and women can dig groundnut. When dug out, the tubers are sorted into three sizes. The small size is almost unsaleable and is kept mostly for home consumption. From 2·125 gunthas 291 lbs. large, 109 lbs. medium and 52 lbs. small tubers were obtained or in all 8,509 lbs. per acre valued at Rs. 203-6-10. The rates were Re. 1-2-0, annas 12 and annas 2 per maund. Incidence of assessment works out to 6·32 per cent.

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* Natural Bágáyat should not have a separate water rate and this field is probably ordinary Bágáyat.

† Mr. Mollison gave Rs. 5 as the cost per acre of digging yams. It cannot take 4 times as much to dig sweet potatoes. There are more tubers of course, but they do not go so deep in the ground. Probably the one estimate is much too high as the other is too low.

*N.B.*—Mr. Mollison's figures are the result of actual observation and probably right. —*J. M. Mackenzie.*

I add the following table :—

| Village. | Field Number. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Per-centage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|---|
| | | | Rs. a. p. | Rs. a. p. | | | Rs. a. p. |
| Kumbhária ... | Survey No. 183 (Exp. No. 70). | Sugarcane ... | 200 0 0 | 16 13 10 | 8·43 | Soil ... 24<br>Subsoil ... 6 | 12 3 0 |
| Magob ... | Survey No. 27 (Exp. No. 71). | Do. .. | 296 0 0 | 12 13 0 | 4·32 | Soil . 17½<br>Subsoil .. 4 | 8 11 9 |
| Adájan ... | Survey No. 14 (Exp. No. 72). | Do. ... | 191 1 7 | 18 9 7 | 9·73 | Soil ... 20 | 15 0 0 |
| Adájan ... | Survey No. 47 (Exp. No. 73). | Do. ... | 227 8 0 | 18 12 10 | 8·26 | Soil . 21 | 15 12 0 |
| Adájan ... | Survey No. 27 (Exp. No. 74). | Do. ... | 286 4 7 | 17 13 3 | 6·23 | Soil ... 19 | 14 4 0 |
| Kumbhária ... | Survey No. 285 (Exp. No. 75). | Groundnut ... | 55 2 7 | 12 13 11 | 23·32 | Soil ... 24<br>Subsoil ... 6 | 12 3 0 |
| Kumbhária ... | Survey No. 229 (Exp No. 76). | Do. ... | 75 11 4 | 5 4 9 | 6·99 | Soil ... 22½<br>Subsoil ... 6 | 11 9 3 |
| Magob ... | Survey No. 69 (Exp. No. 77). | Cabbages . | 829 4 3 | 12 2 11 | 1·47 | Soil ... 19<br>Subsoil .. 4 | 9 5 6 |
| Magob ... | Survey No. 27 (Exp. No. 78). | Do. ... | 362 6 0 | 12 13 0 | 3·53 | Soil ... 17½<br>Subsoil ... 4 | 8 11 9 |
| Magob ... | Survey No. 49 (Exp. No. 79). | Yams ... | 104 12 8 | 8 13 8 | 8·45 | Soil ... 19<br>Subsoil ... 4 | 9 5 6 |
| Magob ... | Survey No. 35 (Exp. No. 80). | Turmeric and Yams. | 213 7 9 | 13 3 1 | 6·17 | Soil ... 17½<br>Subsoil 4 | 8 11 9 |
| Magob ... | Survey No. 27 (Exp. No. 81). | Do. ... | 269 13 2 | 12 13 0 | 4·74 | Soil ... 17½<br>Subsoil ... 4 | 8 11 2 |
| Kumbhária ... | Survey Nos. 115 118 (Exp. No. 82). | Onions ... | 173 1 7 | 27 0 9 | 15·62 | Soil ... 22<br>Subsoil ... 6 | 11 6 0 |
| Kumbhária ... | Survey No. 285 (Exp. No. 83). | Sweet potatoes. | 203 6 10 | 12 13 11 | 6·32 | Soil ... 24<br>Subsoil ... 6 | 12 3 0 |

Maximum rates are taken, Mr. Fernandez' proposals, at Rs. 6-8 for Kumbhária and Magob, Rs. 12 for Adájan for Bháta. Distance from village scale when applied will of course make a slight difference.

## OLPA'D TA'LUKA.

There were eleven tests taken in the Olpád Táluka, six on *juvár* and five on cotton, all by Mr. Mollison. It is a pity that none could be taken on wheat which is largely grown in the west of the táluka. Gingelly seed also might with advantage have been tested, as it is pretty generally grown in the táluka. There is practically no garden land in the táluka—one village on the Tápti and two or three on the Kim have alluvial Bháta soil. Rice, too, is very little grown as the rainfall is not generally sufficient. Three experiments on rice and one on wheat have been recorded before this year.

I propose to deal with the experiments individually first and then to give Mr. Mollison's general observations about the táluka.

*Experiment No. 84.*—An experiment on *juvár* at Safetabad, a comparatively poor village Mr. Mollison says. The selected crop was as near as possible average for the village. It is estimated at 20 annas. Mr. Mollison thinks this estimate too high. There can be no doubt about it. *Tuver* and *mug* were sown with the *juvár* but came to nothing. The field bore evidence of fairly careful cultivation. It measures 6 acres 8 gunthas and is assessed at Rs. 31-6 or Rs. 5-0-11 per acre. It was manured last in 1893. The rotation is cotton and *juvár*. The soil is black soil, *morat*, supposed to be saltish. The seed rate was the ordinary one, $6\frac{2}{3}$ lbs. for *juvár*, but far above the average for *tuver*—5 lbs. The outturn was 575 lbs. *juvár* and 200 bundles of *kadbi* per acre, valued at Rs. 16-8-5 and the incidence comes to 30·60 per cent. Mr. Mollison does not say who the cultivator is, rather an important point. Nor does he give the kind of *juvar*, although there is a considerable difference between the prices of *Chapti* and *Pirio juvar*. Both are called Deshi and priced at 41 lbs. per rupee. According to the calculations shown by me in Exp. No. 51, *Pirio* is 42 lbs. and *Chapti* $39\frac{1}{8}$ lbs. per rupee. Mr. Mollison gives $32\frac{1}{2}$ lbs. *tuver* per rupee. My price was $33\frac{1}{2}$ lbs. I think Mr. Mollison's price for *kadbi* Re. 1-8 per hundred large bundles, right for Olpád villages some distance from Surat.

*Experiment No. 85.*—This test was taken on *juvár* at the adjoining village of Másma where the crops, both cotton and *juvár*, were decidedly better than at Safetabad. The *juvár* crop here tested is said to be about average for the village. The local estimate is again the maximum, 20 annas. Again I think this is too high, much too high. The field measures 5 acres 16 gunthas and is assessed at Rs. 30 or Rs. 5-8-11 per acre. It is black soil, the same as the last field. It is said to have been manured for cotton the year before; and Mr. Mollison thinks this probably true as the owner occupies 100 Bighas, of which 25 are under grass and has 2 pairs of bullocks, 8 buffaloes and 3 calves. The field was carefully cultivated and had a fair sprinkling of *tuver*. The *juvár* stood very thick; hence the large number of bundles of *kadbi*. The heads though numerous were small. The seed rate is the same as in the last experiment; 5 lbs. *tuver* seems too much. The outturn was 781 lbs. *juvár*, 42 lbs. *tuver* and 353 bundles *kadbi* per acre worth Rs. 23-13-11. Incidence comes to 23·27 per cent.

*Experiment No. 86.*—An experiment taken at Saroli which "is popularly believed to be a good village." Mr. Mollison says the cotton and *juvár* of the village were on the whole quite promising. The owners of the field are Nágar Bráhmans. Its area is 5 acres 9 gunthas and assessment Rs. 32-8. These men own this and three other fields measuring altogether 16 acres and assessed at Rs. 93-8-0; but as the lands are Ját Inám, only pay a quit-rent of Rs. 27. The four numbers are leased by two Anavla Bráhman brothers for Rs. 118, and *they (the tenants) also pay Rs. 27 Government dues. The brother who cultivates the selected field possesses no cattle or tillage implements, but hires everything. He says he buys manure, but this is doubtful. The field, however, looked carefully tilled. The cultivator says he is in arrears with the rent. The manure rate is said to be 10 to 15 loads per Bigha every other year; the seed rate is the same as the last; the acre outturn 735 lbs. *juvár* and 310 bundles *kadbi* worth Rs. 21-13-1 and the incidence of assessment 28·50 per cent. The anna valuation is given at 20.

*Experiment No. 87.*—Another experiment at the same village—Saroli. The outturn here is better, but hardly satisfactory for what is styled a 20-anna crop. The better outturn is attributed to the effect of manure. The cultivator says he manures every other year. Mr. Mollison thinks every fourth year. The cultivator is a Kanbi owning one pair of bullocks, 2 buffaloes, one heifer and 2 calves. The field was carefully tilled. The *juvár* was tall, the stalks rather coarse and the heads of grain large and well filled. The crop was level over the whole field. For want of time Mr. Mollison only cut 5 gunthas. The seed rate was the same as above. The outturn was 888 lbs. *juvár*, 24 lbs. *tuver*, and 250 bundles of *kadbi* worth Rs. 26-3-9 per acre and the incidence works out to 20·54 per cent.

*Experiment No. 88.*—An experiment taken at Ambheta. The eastern portion of the village lies high and grows the cotton-*juvár* rotation. The crops were good and very different to those on the western side which were decidedly poor. The western side is low-lying and the cultivation of cotton is not attempted owing to the water-logged condition of the fields. Rabi crops of wheat or gram take the place of cotton, but none of the crops Mr. Mollison saw promised well. Mr. Mollison continues:—"This year a good many fields failed to grow *juvár* owing to continuous early rain and the cultivators sowed instead late in the kharif season a mixed crop of *tuver*, *tal* and *chibdi* (a sort of cucumber). There were many such fields all with fairly good crops. In these fields, where *juvár* survived the early wet season, the crops had not thriven as they ought to have done owing to scant rain at the end of the season."

The experiment was taken on a field of the class last mentioned. The owner is an Anavla Bráhman owning altogether 80 Bighas, some in the west and some in the east. He has 2 bullocks, 3 buffaloes and 2 calves. He hires bullocks and implements for tillage when required. The field of experiment

* I have had this fact confirmed by separate inquiry.

was some distance from the village but carefully tilled. It was said to have been manured with 10 loads for a portion of the field, but Mr. Mollison does not believe it. The crop was average for the poorer side of the village and was estimated as equal to the average crops of former years, that is, 16 annas. Mr. Mollison thinks it over-estimated. I should say there can be no doubt about it. The seed rate was the same as in the former experiments. The outturn I can only characterise as miserable; 313 lbs. *juvár* grain and 169 bundles *kadbi* worth Rs. 9-12. The acre assessment is Rs. 4-11-11, so that the incidence comes to 48·66 per cent.

The owner sublets some of his land, finding it more than he can manage. Mr. Mollison gives particulars :—

| Survey Number. | Area. | | Assessment. | | Rent received. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | A. | g. | Rs. | a. | Rs. | a. | |
| 121 | 2 | 31 | 15 | 8 | 25 | 0 | Good part of the village. |
| 301 | 1 | 22 | 8 | 0 | 10 | 0 | Poorer part. |
| 340 | 1 | 9 | 5 | 12 | 5 | 12 | " |
| 511 | 1 | 8 | 7 | 8 | 10 | 0 | " |

The figures indicate that there is too little difference in the assessment of good and bad lands in the táluka, a fact which I believe is pretty generally known.

*Experiment No. 89.*— There is another *juvár* experiment at the same village, but taken this time in the better part. The difference in outturn is astonishing. The rotation here is the ordinary *juvár* and cotton one. The cultivator is a Koli, and a good cultivator "like many of his caste in the district." The field had been well manured by folding sheep and goats in it, the result being seen by the numerous *babhul* seedlings amongst the *juvár*. Mr. Mollison thinks the estimate of 20 annas correct. "The seed had been sown twice, and as there was no sign of *tuver* even after the second sowing that pulse was separately drilled in September." Mr. Mollison found this *tuver* immature and could not test it, but says it would probably yield well. For the two sowings of *juvár* 7 *sers* per Bigha of seed were used.

The field measures 6 acres 36 gunthas and is assessed at Rs. 40 or Rs. 5-12-9 per acre. The outturn of *juvár* was 1,005 lbs. grain and 255 bundles of *kadbi* valued at Rs. 27-11-2 per acre. Incidence is 20·92 per cent.

The next experiments are on cotton—5 in number.

*Experiment No. 90.*—Cotton at Másma. The crop is said to have been a good one. There were better crops in the village, but the majority were not so promising. The crop, Mr. Mollison says, was probably a fair average of the good villages grouped together in the south-east part of the táluka. He saw many similar fields within four or five miles distance north and west of Ránder and all along the eastern side of the táluka. Mr. Mollison says:—"The field is about ½ mile from the village. It has black soil and grew in 1892-93 cotton in one portion; castor, *tuver* and *tal* in another portion; cotton in 1893-94 and wheat in 1894-95. The field is reported to have been manured this year with 30 loads ordinary manure for 1 acre 30 gunthas. I question the truth of this statement. The occupant is a Koli. He has no family to help him. He hires labour when required. He occupies 24 Bighas, of which 4 are grass. He owns 2 buffaloes, 2 calves and 4 bullocks, 2 of which are young. The crop, estimated locally at 18 annas, yielded 362 lbs. seed cotton per acre worth Rs. 31-6. The incidence, on Rs. 5-5-9 assessment per acre, works out 17·08 per cent."

For seed 10 *sers* per Bigha is the rate given here and in all Mr. Mollison's experiments. This is a high rate.

*Experiment No. 91.*—Another field in the same village, also held by a Koli. Mr. Mollison says the crop is under average for the village and estimates it at 10 to 12 annas, but says it was about the same as that in many fields of villages in the centre of the táluka north of Másma. The cotton crops within a radius of 3 or 4 miles round Olpád were on an average no better than that of this

field; a fair dressing of manure is probably given occasionally to this field, but none was applied last year. And the question is when the manure was last applied. "The cultivator has two grown-up sons. The holding is about 40 Bighas, all in cultivation. The owner has 4 work cattle, 2 buffaloes, 2 cows and 5 younger animals. The cultivation was only fair, the land being to a certain extent weedy, but not badly so. Cotton and *juvár* are taken in alternate years." The outturn was 268 lbs. of seed cotton per acre worth Rs. 23-3-7. The incidence, on Rs. 5-14-7 per acre assessment, works out to 25·45 per cent.

*Experiment No. 92.*—An experiment at Saroli. The field was specially selected by Mr. Mollison as a first class crop. The land had been under grass and was broken up for cultivation five years ago. The fertility of the field is therefore at present much greater than that of fields long under cultivation and manured inadequately. Mr. Mollison thinks the outturn represents what good black soil is capable of producing "if liberally manured and periodically fallowed." The field was said to have been manured, but Mr. Mollison doubts anything more than a very light dressing. The present cropping is the *juvár* and cotton rotation. The cultivators are a *Koli* family of five brothers owning 25 Bighas, 2 bullocks 1 buffalo, 1 cow and 2 calves. The crop was estimated at 20 annas. It yielded 575 lbs. per acre of seed cotton worth Rs. 49-13-4, and the incidence on assessment, Rs. 6-0-9 per acre, comes to 12·13 per cent.

*Experiment No. 93.*—The other Saroli field may be taken, Mr. Mollison says, like the field of Exp. No. 90 as an average one for the better Olpád villages, and for Saroli itself. The occupant again is a Koli. He and his three sons work the holding of 38 Bighas and own 2 pairs of bullocks, 3 buffaloes and 1 cow. The field is occasionally manured, but nothing was applied last year, and we do not know how long it is since it was applied. The field measures 5 acres 6 gunthas and is assessed at Rs. 36-8 or *Rs. 7-1-5 per acre which is a high rate. The rotation is cotton and *juvár* with occasional crops of gingelly seed and *tuver*. The cultivation is described as good and the anna valuation 16. The outturn was 352 lbs. seed cotton and the incidence comes to 23·23 per cent.

*Experiment No. 94.*—The last cotton test was taken at Ambheta. The condition of the village lands is described in Exp. No. 88. The selected crop is said to have been about the average for the village, but above the average of ordinary years. It was estimated at 18 annas. The manure applied is said by the cultivator to have been 35 loads for 3 Bighas, but this is, as Mr. Mollison says, unlikely. Some was, however, applied and the cultivation was careful, the field being quite free from weeds.

The field measures 4 acres 27 gunthas and is assessed at Rs. 24 or Rs. 5-2-2 per acre. The outturn was 327 lbs. seed cotton per acre worth Rs. 28-5-8 and the incidence works out to 18·11 per cent.

The six *juvár* tests give an average outturn of Rs. 20-15-8 and incidence of assessment 26·30 per cent. The five cotton tests give an average outturn of Rs. 32-10-6 and incidence of assessment at 18·08 per cent. Taken together the average outturn of the rotation comes to Rs. 26-13-1 and percentage incidence of assessment 22·20. It should be noted that among the *juvár* tests was one very bad crop and among the cotton tests one very good one.

Previous tests on rice by Mr. Kotvál in 1892 showed low incidences, and an inferior crop of wheat by Mr. Umedrám Ranchhoddás in 1890 showed an incidence of 21·96 per cent.

I give a table for this year's tests.

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* The maximum rate for Saroli was Rs. 6-8. The fact that the assessment is actually considerably higher than the maximum, is explained by the great license which Mr. Shambhu Prasád, the former Settlement Officer, allowed himself in the application of the distance from village site scale.

| Village. | Field. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhagg annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|---|
| | | | Rs. a. p. | Rs. a. p | | | Rs. a. p. |
| Safetabad ... | Survey No. 10 (Exp. No. 84) ... ... | Juvár .. | 16 8 5 | 5 0 11 | 30·60 | Soil 12½ | 4 11 0 |
| Másma ... .. | Survey No. 73 (Exp. No. 15) ... ... | Juvár, &c.. | 23 13 11 | 5 8 11 | 23·27 | Do. 14 | 5 4 0 |
| Saroli ... ... | Survey No. 93 (Exp. No. 86) ... ... | Juvár ... | 21 13 1 | 6 3 6 | 28·50 | Do. 14½ | 5 14 8 |
| Saroli ... ... | Survey No. 61 (Exp. No. 87) ... ... | Juvár, &c . | 26 8 9 | 5 6 3 | 20·54 | Do. 12½ | 5 1 3 |
| Ambheta... ... | Survey No. 324 (Exp. No. 88) ... ... | Juvár .. | 9 12 0 | 4 11 11 | 48·66 | Do. 13½ | 5 1 0 |
| Ambheta ... ... | Survey No. 280 (Exp. No. 89) ... . | Juvár ... | 27 11 2 | 5 12 9 | 20·92 | Do. 14½ | 5 7 0 |
| Másma ... ... | Survey No. 78 (Exp. No. 90) ... ... | Cotton .. | 31 6 0 | 5 5 9 | 17·08 | Do. 14½ | 5 7 0 |
| Masma ... ... | Survey No. 160 (Exp. No. 91) ... ... | Cotton ... | 23 3 7 | 5 14 7 | 25·45 | Do. 14 | 5 4 0 |
| Saroli ... ... | Survey No. 107 (Exp. No. 92) ... .. | Cotton .. | 49 13 4 | 6 0 9 | 12·[illegible]3 | Do- 15 | 6 1 6 |
| Saroli ... ... | Survey No. 75 (Exp. No. 93) ... .. | Cotton ... | 30 8 1 | 7 1 5 | 23·23 | Do. 15½ | 6 4 9 |
| Ambheta ... ... | Survey No. 225 (Exp. No. 94) ... ... | Cotton ... | 28 5 8 | 5 2 2 | 18·11 | Do. 13 | 4 14 0 |

The rates proposed by Mr. Ozanne for revision survey are taken. They are for Saroli Rs. 6-8 and for Másma, Safetabad and Ambheta Rs. 6. There has been no change in the classification and the old rates are to be kept. The figures in the last column therefore show what the old rates would have been had there been no old distance scale. They will be slightly changed by the new distance scale.

Mr. Mollison has something to say about the condition of the agriculture and the cultivation of the Olpád táluka. He says :—

"Throughout the táluka this year there are remarkable differences between the *juvár* crops of different villages and to a less extent in the same village. I believe that the same differences exist every year. Some fields are badly cultivated and grow poor crops owing to the occupants being of an inferior cultivating class ; but the inferiority of crops is, I think, largely due to poor and impoverished soil and because many fields after heavy rain are water-logged. *Juvár* crops of the táluka are this year generally poorer than those of Chorási, except perhaps between Sáyan and Amroli and between Sáyan and Saroli. In the eastern section of the táluka the villages which have good *juvár* crops this year have also good crops of cotton. In other parts of the táluka the cotton even in the poorer villages is distinctly more promising than the *juvár*. In many villages on the western side of the táluka, wheat takes the place of cotton. This year owing to the scant late rainfall there is not sufficient moisture in the soil to ripen the wheat properly, and I fear the outturn will be disappointing. In the " wheat " villages *juvár* also is comparatively a poor crop, particularly in low lying water-logged fields. The *juvár* in such fields had to be sown more than once, and where it failed after repeated sowings, *tuver*, *tal* and *chibdi* (cucumbers) were sown seasonably midway between kharif and rabi seasons, and this mixed crop promises exceedingly well ; but as it is a mixed crop ripening at various seasons it is almost impossible to test it. It would undoubtedly be advantageous if a mixed crop of *tuver* and *tal* took its place regularly in the rotation of the wheat villages. *Juvár* and wheat grown alternately is a very bad combination. *Tuver* and *tal* as a mixed crop would exercise an ameliorating and renovating effect which would be particularly beneficial in those villages where the people are poor, where cattle are scarce and where manure is exceedingly scant. I fear these conditions are not uncommon throughout the greater portion of the táluka. For obvious reasons the cultivators give a very exaggerated estimate of the quantity of manure

applied to fields selected for test. I do not believe their statements neither in respect of manure applied nor of tillage given. I can hardly believe that manure is ever bought for purely dry crop land. The number of cattle owned is a fair guide to the quantity actually available. A cultivator who owns milk buffaloes as well as a sufficient number of work cattle grows decidedly better crops and has his land in much better condition than a less well-to-do man.

"The season was favourable except in low lying water-logged fields. The heavy early rains destroyed early sown crops in such lands, and even second and subsequent sowings did not succeed.

"In Chorási the cotton crops are much more level than in Olpád. In the latter táluka cotton is grown only in the good villages and in the higher lying fields of such villages as are liable to be water-logged during heavy monsoon rain. Therefore cotton rotated with *juvár* occupies the best of the black soil of the táluka. The cotton crops in this class of land ought to be equally good with those in Chorási if the cultivation in both the tálukas was equally good or equally bad. On an average the cultivation is better in Chorási than in Olpád. The agricultural population in Olpád is, I think, generally poorer than in Chorási, and I believe that a larger cotton-*juvár* area per pair of bullocks is cultivated in Olpád than in Chorási. Olpád cultivators, I believe, own fewer breeding cattle on an average than Chorási cultivators do and in consequence the available manure supply of Olpád is less for the dry crop area than that of Chorási. I feel sure that the inherent fertility of the Olpád black dry crop land, except in the good villages, is of a considerably lower level than that of Chorási. In all likelihood the disparity is likely to increase. The Olpád agriculturists are in the worst villages, undoubtedly poor, and even a succession of good seasons would not help them much. Increased profits would go to the Sávkár or be expended in marriage festivities or other celebrations. I think it is likely that better crops of *juvár* and of cotton were produced in the Olpád black soil at the time of the original settlement than are now produced. There is nothing to prove that the natural fertility is declining, but it stands to reason that such is the case, because manure is rarely, if ever, bought for dry crop land, and it is only a mere fraction of the produce which is fed to the owner's cattle and a still smaller fraction which finds its way back to the soil as manure. The whole cotton produced is sold, seed as well as lint. All grain, except what is consumed by the owner and his family, is sold. A very considerable proportion of the *juvár kadbi* is also sold, Surat being a very good market for *kadbi*. It is true that a good deal of manure, both poudrette and cattle manure, is bought in Surat by agriculturists, but this manure does not go to the cotton-*juvár* fields. It is used entirely for the market gardens of the neighbourhood. In fact, this town supply is inadequate for the extending cultivation of garden crops, and village manure, which ought to go legitimately to the cotton-*juvár* fields, is sold to the market gardeners and sugarcane growers at a high price, Re. 1 per cart-load. The above is not intended as a plea to lower the assessment on those Olpád villages where the burden of assessment bears heaviest. It is rather intended to indicate one reason why the burden does bear heavily, as it undoubtedly does, in some villages."

There can be no doubt whatever as to the truth and the importance of the main fact which Mr. Mollison has so clearly pointed out. Year after year crops of *juvár* and cotton are taken from the black soil land, and little, if any, return is made. Productiveness must decrease and in thickly populated countries sooner or later this must be felt. And it is probably already being felt not only in Olpád, but in Chorási as well. But I cannot help thinking that Mr. Mollison has seen the best of Chorási and only the medium part of Olpád. The parts of Chorási near Surat—Kumbharia, Magob, Adájan, Bhathár, even Althán—are the finest parts of the táluka. On the other hand, Safetabad, Masma, and Ambheta are far from being in the best part of the Olpád táluka, and indeed Ambheta may almost be classed among the worst villages. Camping at Sayan I saw the east of the táluka and I was astonished at the fineness of the *juvár* between Sáyan and Kudsád, and the whole of one-third of the táluka on the east had excellent crops. I have never seen finer *juvár* than that between Sáyan and Kudsád, neither at Magob nor in the Jaláipor and Bárdoli tálukas. It is a great pity that no tests could be taken from these villages.

Then again there is no doubt that in many villages the Olpád cultivators do not equal in skill and care the men of Chorási. There are many Koli villages in Olpád, and, though these men are not anything like such poor cultivators as they are often taken to be, they do not usually equal the Kanbi or the Anavla. The cultivators in Olpád Kasba itself and several other villages are Musalmáns and they have said to me that they do not pretend to be cultivators, they are sepoys.

The anna estimate given by Mr. Mollison for his tests is everywhere high. There is no doubt that Safetabad, Másma and Ambheta did not have anything like a 16-anna crop as a rule this year. Two-thirds of the táluka on the western side suffered from the unusually scanty rainfall. In the matter of rainfall requirements, the táluka is divided into two very well-marked divisions with a broadish border line between them. On the east a heavy rainfall is destructive to the *juvár* and to a smaller extent to the cotton. Many fields are water-logged. This year's scanty rainfall suited that portion. On the west a heavy rainfall is beneficial and indeed for good crops necessary. This year the crops were very poor through lack of rain. I was told everywhere that the crops were 8-anna crops.* Between these two halves runs a strip which may suffer from too much or too little rainfall. This year it undoubtedly suffered from too little. In this strip are Safetabad and Másma and Saroli.

## BALSA'R TA'LUKA.

In the Balsár táluka there were 18 experiments taken, 3 on grass by Mr. Mehta, 7 on rice, 6 on second crops following rice, 2 by Mr. Pránlál and the rest by Mr. Mehta, and 2 on sugarcane, one by Mr. D'Souza and one by Mr. Mehta. There have been 13 experiments done in the táluka in previous years which will now be found very useful for comparison.

The re-classification of the táluka has not been yet done. In considering the rice experiments it is important to remember here, as elsewhere, that the season was below the average, especially for the second crop. It will be noticed how very low all Mr. Mehta's anna estimates for the second crops are. I am not at all sure they are too low.

*Experiment No. 95.*—Grass at Málvan. Mr. Mehta gives very meagre details of these grass experiments. He nowhere even states what sort of grass it is that he has in the three experiments tested. He prices the grass of this and the next test at Rs. 7 per thousand bundles. The area of the field is 24 gunthas and its assessment 13 annas or Re. 1-5-8 per acre. The acre outturn, estimated as an average or 16-anna crop, was 1,024 bundles or 1,400 lbs. valued at Rs. 7-2-8. The incidence comes to 18·89 per cent. The season was favourable, the late showers in October being very beneficial. The field was let out at a rent of Rs. 2-8 for the grass. Mr. Mehta says the occupant pays the assessment. It is not clear what he means by the "occupant;" a reference has elicited the fact that the superior holder pays.

Málvan belongs to group IV, with a maximum dry crop rate of Rs. 3.

*Experiment No. 96.*—Grass at Vásan, which like Málvan, is a village of the 4th class. The field appears to be a very large one, 10 acres 28 gunthas assessed at Rs. 14 or Re. 1-4-11 per acre. The outturn, 16 annas, is 1,352 bundles or 1,688 lbs. per acre valued at Rs. 9-7-5, and the incidence comes to 13·82 per cent.

*Experiment No. 97.*—Another grass field at Vásan measuring 1 acre 1 guntha and assessed at Re. 1-4 or Re. 1-3-6 per acre. Outturn 1,600 small bundles or 1,384 lbs. valued at Rs. 8 or Rs. 5 per thousand, and the incidence comes to 15·23 per cent.

The only expenditure on grass lands is the labour of cutting, tying up, watching and carting away the grass. Mr. Mehta says: "Grass is kept three days in the field to dry after it is cut; ¼ anna is paid for cutting 24 *kolias*. A *kolia* is equal to 3 handfuls, and a handful of grass is as much as can be retained in the left hand while cutting. About three *kolias* make one *pulli* or bundle.

* That was because I was acting as Assistant Collector and when I was not taking crop experiments, which makes a difference.

Tying is paid for at the rate of ¼ anna for 75 *pullis* or bundles. Thus in the case of Exp. No. 95 at Málvan there were

| | Rs. | a. | p. |
|---|---|---|---|
| cut 690 *kolias* ... ... ... ... | 0 | 7 | 2 |
| and tied 256 *pullis* ... ... ... ... | 0 | 0 | 10 |
| Total for 10 gunthas ... | 0 | 8 | 0 |
| For 1 acre ... ... ... ... ... | 2 | 0 | 0 |

Grass lands lightly assessed pay very well indeed. Besides grass there may be *bábhul* or date palms or palmyras, all of which yield a considerable return for practically no expenditure. Málvan is well known for its toddy. Toddy from Málvan is taken as far as 30 miles in the day and the tree tax amounts to Rs. 14,000. Not only so, but many trees are taxed at reduced rates when belonging to Káliparaj owners who tap their trees for their own private consumption.

I may mention that the Málvan and the second field at Vásan were classed at the original survey at 7 annas and the first Vásan field (Survey No. 155) at 7½ annas.

Now I turn to the rice tests.

*Experiment Nos. 98 and 99.*—Rice at Gundláv followed by *val*. The field measures 1 acre 34 gunthas and is assessed at Rs. 26 or Rs. 14-0-10 per acre. Maximum rates at present for this village (group III) are for soil Rs. 4 and for water Rs. 10-8. The field might possibly have been assessed at Rs. 19-12.

The rice is *Kada*. The outturn was according to Mr. Pránlál 1,166 lbs. dry paddy and 1,452 lbs. of dry rice straw valued at Rs. 27-11-2. The anna estimate given is 7. Seed rate 130 lbs. per acre. The cultivator was a Káliparaj man and the cultivation was indifferent, there having been no proper weeding. Ten loads of manure on 1 acre 34 gunthas were given. The field is said to have been leased by the owner to the Káliparaj man. Rent is not stated.

The second crop was *val*, estimated as a 13-anna crop. Seed rate is 50 lbs. per acre. Outturn 753 lbs. pulse per acre worth, with 540 lbs. *gotar* or leaves, husks, sticks, &c., Rs. 16-3-5. The total value of the double crop is Rs. 43-14-7 and incidence on the same 32·00 per cent. which is high. But as the season was bad and the cultivation poor, there is really nothing to complain of.

I do not regard this double experiment as quite satisfactory. Mr. Pránlál gives the most meagre details about the crop itself, but writes at length about the precautions he took and how the rice was cut and taken to the Mámlatdár's *Kacheri* and subsequently dealt with. Most of the rice in the village was cut before the experimenter could get to the spot. It is clear also that the crop was not an average one. The land was leased by the owner to another. Mr. Pránlál might have found out the rent.

Mr. Pránlál quotes *Kada* at 45½ lbs. per rupee. This rate is, I am confident, too high. Mr. D'Souza gives for Balsár 50½ lbs. which corresponds to 12 annas per maund, and which I know is the same as in Jalálpor and Bárdoli and Surat (allowing for municipal taxes). Then again Mr. Pránlál states that he kept 5 *sers* of grain and found it lost half a *ser* by dryage, and in making his calculations has assumed that rate of dryage. This comes to 10 per cent. and is, I am sure, too high; and 4½ *sers* seems probably not an exact figure. The suspicion remains that proper care was not taken. Again for *val* Mr. Pránlál quotes the price as 57½ lbs. per rupee in Balsár and 45½ lbs. in Chikhli, while Mr. Mehta gives 57½ lbs. at Chikhli; 57⅝ lbs. was the rate I took at Jalálpor and Bárdoli and is probably the correct rate, approximately, throughout the district. As for the anna estimate, Mr. Pránlál writes:—"7 in a rupee of 16 annas." The meaning of this remark is hardly clear, but as Mr. Pránlál enters 18 as the anna estimate in one of his experiments, it appears that his maximum is 20, which is the standard adopted by Government. The *val* crop was cut and threshed by Mr. Mehta. The 540 lbs. of byproduct includes stalks which are worthless except for fuel. Supposing that there were 350 lbs. *gotar* or leaves and husks useful as fodder, its valuation at Rs. 3-2-0 is rather high, less than 3 maunds per rupee. I should be inclined to value the rice at Rs. 25-8 instead of Rs. 27-11-2 given by Mr. Pránlál. The incidence would then come to about 34 per cent.

*Experiment Nos. 100 and 101.*—Mr. Pránlál's second experiment on rice, *Vánkvel*, and a second crop of *vatana* (Pisum sativum) was made at Nandávla.

The field measures 2 acres 26 gunthas and is assessed at Rs. 21 or Rs. 7-14-10 per acre. The soil is *káli besar*, a light variety of black soil. The anna estimates here are 12 for rice and 8 for *vatána*; and seed rates were 141 lbs. and 55 lbs. respectively. About 50 loads of manure are said to have been put on the whole field including the rice seed-bed which was in the field. The season for this field is said to have been fair "owing to the rainfall being scanty, as the soil is of such a nature that no rice can grow if the rainfall is heavy." Mr. Pránlál does not explain how this is. The cultivation of the rice is described as good and of the *vatana* as indifferent. Mr. Pránlál explains no further. The outturn is 1,974 lbs. rice and 631 lbs. *vatána* per acre. These with their byproducts are valued at Rs. 50-8-8 and Rs. 23-9-11, in all Rs. 74-2-7, and the incidence of assessment on the double crop comes to 10·69 per cent.

The remarks here, too, are most meagre. Rice, *Vánkvel*, is valued at 43 lbs. per rupee and *vatána* at 32 lbs. Both these rates appear to me very high, especially the latter. Mr. D'Souza gives 47½ lbs. per rupee for *Vankvel* rice and that is probably nearer the truth.

Nandavla is a village of group III; rice lands have maximum rates of Rs. 4 for soil and Rs. 10-8 for water—the same as Gundláv.

*Experiment Nos. 102 and 103.*—Experiments at Dhamdáchi on rice, *Vánkvel*, by Mr. D'Souza and *vál* by Mr. Mehta. The latter officer deserves much credit for the way in which he has managed to test numerous second crops on fields where the rice has been taken by other experimenters. Of the two crops rice and *vál* the former is far the easier to test. The field measures 1 acre 21 gunthas and is assessed at Rs. 20 or Rs. 13-1-10 per acre. The soil is *káli besar*. The cultivation is described as good, and the anna estimate for rice is given as 16; 151 lbs. of seed per acre were used, 6 gunthas of seed-bed (*rohivm*) being allowed for the 1½ acre of field. The seed-bed was manured with 6 loads of manure and was once weeded. The rest of the field is said to have been manured with 30 loads of manure and 150* sheep were folded on it for about a month, the shepherd being allowed in return to graze his flock on the Khátedár's Jiráyat land of about 100 acres.

Mr. D'Souza gives in each of his rice experiments the number of labourers employed. As these statements cannot in each case be satisfactorily proved, I omit them as a rule for the individual tests.

The field is under a tank for which there is a *himáyat* rate of Rs. 6-0-1 for the whole field, which figure is included in the assessment. Mr. D'Souza further says: "This number was assessed at original survey to Bágáyat *kasar* of Rs. 17-14 which was remitted by Government Resolution No. 7713, dated 27th September 1884, and Commssioner N. D.'s No. 362 of 29th March 1890, as the well fell into disrepair and supply of water failed."

The field is said to have been watered by gravitation and as the scanty rains hardly filled the tank, its water-supply was insufficient.

The *vál* was sown broadcast at the rate of 60 lbs. per acre. Its outturn, reckoned a 4-anna crop, came to 207 lbs. of pulse. The rice came to 2,025 lbs. grain and 3,120 bundles. *Vánkvel* rice is priced by Mr. D'Souza at 47½ lbs. the rupee. *Vánkvel* rice is a finer variety than *Kada* and ripens some ten days later. *Vál* is priced by Mr. Mehta at 57½ lbs. per rupee, *val* leaves, *gotar*, at 150 lbs. per rupee, and *vál* stems and stalks at 40 lbs. per anna. Mr. D'Souza does not satisfactorily value the rice straw. He says it is worth Rs. 3 per acre in Balsár and Párdi and Rs. 6 per acre in Chikhli. It is obvious that the yield of straw varies immensely per acre. Mr. D'Souza says it is commonly held to be worth Rs. 3 per acre. That may be so. But what we want to know is what each field tested actually yielded. To carry Mr. D'Souza's principle a little farther is to do away with any need for crop experiments at all. It would be sufficient to say that the yield of rice is commonly held to be 1½ to 2 maunds per guntha. On reference Mr. D'Souza refuses to give any other valuation and says the valuation of rice straw must be "theoretical." It has to be rough, but why theoretical I do not know. I think it is better to value the straw at 1,000 bundles per rupee. It is sold by the cart-load and about 1,000 bundles go to

* This appears to me very liberal treatment.

the cart-load, which is sold at Re. 1. At this valuation the rice outturn is worth Rs. 45-12 and the *vál* Rs. 4-13-9 per acre or together Rs. 50-9-9, and the incidence of assessment comes to 25·91 per cent.

*Experiment Nos. 104 and 105.*—Experiments at Chikhli on rice, *Kada*, by Mr. D'Souza and *vál* by Mr. Mehta. In the rice experiment the seed-bed was rábed, the ráb materials being 2 cart-loads of cattle dung weighted down with 2 cart-loads of sweepings. The bed was prepared in a part of the field and was 3⅓ gunthas in area and the quantity of seed was 60 lbs., giving an average of 7·8 gunthas and 141·2 lbs. per acre. The seedlings were not transplanted till August owing to a long break in the rains and the yield is said to have been affected thereby. The whole field (Pot number) measures 17 gunthas and is assessed at Rs. 6-6, of which Rs. 2-3-8 is for tank *himáyat*, or Rs. 15 per acre. The soil is *káli besar* and the cultivation is described as good. The field itself was lightly dressed with 1½ cart-loads of manure. There was at the first break in the rains a preliminary ploughing, and half a maund of *san* seed was broadcasted. Early in August the *san* was ploughed in and the field puddled at the same time by two ploughings and a levelling. The seedlings were then transplanted. The field was once flooded in October. The yield of rice, estimated as a 12-anna crop, was 1,651 lbs. per acre and straw 2,580 bundles. The value* comes to Rs. 35-4-6.

The *vál* was a poor crop, 5 annas. The seed, 40 lbs. per acre, was drilled. The outturn was 286 lbs. pulse and 105 leaves, &c., and 160 lbs. stalks valued at Rs. 5-14-9. The total value of the two crops comes to Rs. 41-3-3 and the incidence works out to 36·40 per cent.

Mr. Mehta gives the following interesting note on *vál* :—

"It forms with rice, *nágli* or *juvár* bread the staple food of the people of the Káliparaj races. It is generally eaten boiled by the poor. The well-to-do make various preparations of the *vál* pulse. *Vál* fodder of course is a valuable addition to the food of the cattle.

"There are many varieties of *vál*. That grown as a second crop in rice lands is a bitter variety called *kadva vál*. The *Surti* or *safed* white *Pápdi* produces sweet *vál*. This is grown more as a garden crop, and over the hedges round almost every household are seen climbers of *Surti Pápdi*. The *Pápdi* or pods in their tender stages are relished as vegetable by all classes of natives. In the rich garden soils a variety of *vál* is grown which is also bitter in taste. It is drilled along with rice, *tuver*, &c., in the months of June and July and is harvested in February. Its pods are smaller than those of the bitter variety described above. There is a fourth variety which is not grown much. Its seed is of the size of double beans.

"*Vál* is a tender crop and is subject to various diseases. The seedlings fall a prey to a caterpillar called *Kámalia*. These caterpillars resemble in appearance those which appear in large numbers on every house step, wall, &c., during the monsoon, but attain a much larger size. If the crop escapes from the ravages of *Kámalia* it might be damaged† by a few severely cold nights in the month of January. Warm cloudy weather at the time when the plants are in full bloom, has a tendency to cause shedding of the flowers, thus reducing the yield of beans very considerably. In the mature stage an insect pest attacks it. The disease is called *Chikta*. The whole plant is covered with innumerable white minute insects. There are hardly any beans to be seen, but the leaf growth is abundant, producing a large guantity of fodder, which, however, is not of much value, being spoilt by the attack of the insects. If through some cause or other there is a delay in sowing the seed, the opportunity is either lost, as the land soon becomes too hard for sowing, or if sown at all the yield‡ is considerably reduced.

* I calculate straw in Balsár táluka not at Mr. D'Souza's rate of Rs. 3 per acre, but at Re. 1 per thousand bundles. The remark applies to all the Balsár experiments.

† In the Bárdoli táluka I was told that one of the reasons for sowing *san* round the edges of *vál* fields was that the tall *san* plants might help to protect the *vál* from frost.

‡ Compare my experiments on rice at Puni, táluka Bárdoli, and the remark there about the second crop of *vál*.

"*Val* is sown broadcast at the rate of 60 lbs. of seed per acre, or, as is more* generally the case, drilled by means of the plough at the rate of 40 lbs. per acre. Rarely a good crop is produced by simply dropping the seed in cracks and doing nothing to the soil afterwards. This is only possible in fields which retain a lot of moisture in the subsoil while the surface soil cracks immediately after the rainfall."

*Experiment Nos. 106 and 107.*—Experiments at Sarodhi on rice, *Kada*, by Mr. D'Souza and *láng* by Mr. Mehta. The Pot number tested measures 18 gunthas and is assessed at Rs. 8, including Rs. 4-2-2 for tank *himáyat*, or Rs. 17-12-5 per acre. The soil is *káli besar*. The anna rate is 10 for rice; the cultivation good. Seed rate was 145 lbs. per acre in 9·3 gunthas† of seed-bed. The actual seed-bed measured 3½ gunthas in extent. It was manured with 4 loads of manure, and the remainder of the field, 14½ gunthas, was dressed with 6 loads. The tank was not used, as there was not enough water in it. The rice outturn comes to 1,213 lbs. per acre and 1,700 bundles of straw, which is very low.

Mr. Mehta estimates the *láng* as a 9-anna crop. Thirty-five pounds of seed per acre were drilled. The outturn was 441 lbs. pulse, 377 lbs. leaves, &c., and 103 lbs. stalks worth Rs 10-13-11, *láng* being valued at 50 lbs. the rupee, leaves, &c., 200 lbs. the rupee and stalks 40 lbs. per anna. *Láng* fodder is only half the value of *vál* fodder.

The value of the rice crop comes to Rs. 25-11-11 and with the *láng* the total value is Rs. 36-9-10. Incidence is very high, 48·56 per cent. Both crops were, however, very poor. Both would have been considerably better if the tank had acted as it was supposed to act as a *himáyat* or protection against scanty rainfall.

*Experiment Nos. 108 and 109.*—Rice, *Kada*, tested by Mr. D'Souza and *val* by Mr. Mehta. The rice anna estimate is given as 20, which I fancy is too high; 16 is probably nearer the mark. The soil is *káli besar* and the cultivation is described as 'high.' The field (Pot number) measures 34 gunthas and is assessed at Re. 1-6 or Re. 1-9-10 per acre. The number is of course assessed as Jiráyat. It was converted into rice land about 10 years ago. Till lately it was leased out. The cultivators pay the Government assessment and half the produce to the Khátedár as rent, who therefore must have made rather a good thing out of it. The Khátedár now cultivates himself. He stated that the field never yielded more than 17 maunds till this year. This of course I do not for a moment believe, as it only comes to half a maund per guntha or Rs. 15 worth of produce per acre, while this year the outturn is worth well over Rs. 60. The seed-bed measured 8 gunthas. It was after ploughing manured with 8 baskets of fish manure at 4 annas a basket. After the seed was broadcasted the seed-bed was ploughed again so as to cover the seed and fish manure and prevent dogs from getting at the latter. The field itself was green manured, 1½ maunds of *san* being sown and dug in when 2 feet high. It was also manured with 20 baskets of fish manure per acre. The seed rate was 185 lbs. per acre, which seems excessive, but I accept it as correct. The shortness of the rains did, it is said, less harm to this field than to others owing to the earliness with which the sowing and transplanting operations were carried out. The outturn was 2,984 lbs. per acre and 1,620 bundles straw. Why the number of bundles is so low I do not quite understand. The yield is valued at Rs. 60-11-2. The *vál* outturn, estimated by Mr. Mehta as an 8-anna crop, is decidedly poor, being only 388 lbs. per acre of pulse. The seed was drilled, 40 lbs. per acre. The value of the outturn is Rs. 9-4-11. Mr. Mehta has nowhere made any remarks for the individual experiments among the second crop tests he has taken. This is a pity, for it would be interesting to know why the outturn of the second crop was so poor. There can, however, be little doubt that it is owing to the soil not having retained sufficient moisture after the short rainfall. The total value of the two crops was Rs. 70-0-1 and the inci-

* Usually broadcasted in the north of the district.

† Calculated. For an actual acre probably so much would not be required. More seed is always sown proportionally for small areas.

dence 2·30 per cent. This of course is extremely low, but the land will now be re-classed as rice and assessed accordingly.

What that assessment will be it is impossible for me to say without knowing maximum rates and classification. It would not, however, be very high, because there is no tank and therefore water annas cannot exceed 8; and because at present for soil Párnera is in group V with a maximum soil rate of only Rs. 2-8.

*Experiment No. 110.*—The last experiment on rice was taken by Mr. D'Souza at Ronvel. The variety is *Vánkvel.* The field measures 1 acre 33 gunthas and is assessed at Rs. 17-8, including Rs. 7-4-10 for tank *himáyat* or Rs. 9-9-5 per acre. The soil is *kali besar.* The field is said by Mr. D'Souza to grow rice and *vál* invariably. Mr. Mehta reports that there was no second crop this year "in or near the *kiari.*" The seed-bed was partly rábed* and partly not rábed. Whether it is on the whole better to ráb or not in Balsár appears doubtful. If a seed-bed is rábed, it does not require weeding. To the *rohium* 4 loads of manure were applied; to the *ádhar* 6 loads; the manure on the latter was weighted down by 4 loads of *kodra* stalks. The *ádhar* measured 8 and the *rohium* 5 gunthas. These 13 gunthas were sown with 5 maunds of seed for 2 Bighas of land (52 gunthas). Seed rate therefore comes to 9¾ gunthas seed-bed and 145 lbs. seed per acre; ∴ the traditional 2½ maunds per Bigha: Mr. D'Souza says. The "traditional" quantity in Bárdoli was only half this or a little more.

For the rest of the field no manure was this year applied, but the field was said to have been manured at the rate of 46⅔ loads per acre the year before. As the cultivator has only a few cattle he cannot manure the whole of his holding every year.

The outturn was estimated by Mr. D'Souza as an 18-anna crop. This may be too high, as the season is said to have been one of "scanty rainfall." The grain outturn was 2,728 lbs. and the straw 2,630 bundles per acre. Total value of the produce was Rs. 60-0-11 and incidence 15·96 per cent. It must be remembered that there is usually a second crop.

Mr. D'Souza remarks:—"This number like about 30 other surrounding numbers bears a fairly high tank *himáyat*, yet the tank is silted up and its waste weir tumbled down; it is now perfectly useless for purposes of irrigation."

There were two experiments on sugarcane taken in the táluka, one by Mr. D'Souza and one by Mr. Mehta, both on the Malbári variety. Mr. Mehta (Exp. No. 112) gives a good account of the cultivation of sugarcane of this variety of cane in Balsár and the southern tálukas of the district. There are here three common varieties: Malbári (white), Khajuria (red) and Bhuri† (grey). Khajuria is grown only in Jiráyat fields, as it cannot stand the excessive moisture of rice land in the monsoon. Malbári ripens in 10 or 11 months, but the other two require 12 months. If Malbári be left longer it flowers.

*Experiment No. 111.*—An experiment on Malbári cane by Mr. D'Souza at Abráma. Two survey numbers close together practically form one holding. They measure together 1 acre 8 gunthas and are assessed at Rs. 20-10 or Rs. 17-3 per acre. The land is Bágáyat. Mr. D'Souza says the *kasar* is not shown in the *Káyam Kharda* (Village Form No. 1). Either the land is classed as Natural‡ Bágáyat or a little enquiry would have discovered a Bágáyat *Tukta* from which the amount of *kasar* could have been found.

The Khátedár before the rains of 1894 carted about 150 loads of fresh *gorádu* soil from his *vádi* (plantation of some sort, probably mangoes) into the field and applied 100 loads of manure. He grew a crop of *Kada* rice and then sublet the field for sugarcane cultivation for Rs. 5 per *vása* or Rs. 150 per acre. This rent, which is very high, in consideration of the manure applied, includes the right to use the Khátedár's well. The Khátedár pays the assessment. The lessees began operations by several ploughings and levellings and clod crushings. The cane was planted by the plough. 1,860 *sántas* of cane were used per acre. A *sánta* is 6 *háths* of cane and may include two or even three canes, and the seed cane costs

* Rábed beds are called *ádhar* and unrábed beds *rohium* or *taru.*
† *Káli, bhuri* or *ráti*—the variety tested in Bárdoli.
‡ Like the rice lands tested by me at Puni and Bárdoli.

Rs. 35 per 1,000 *sántas*. Planting was immediately followed by a flooding. Twenty days after this, the field was weeded and hand-hoed by means of a *kudali* to loosen the soil as it dried and caked. The next watering was given early in February. In all there were 8 waterings till the rains, and the field is said to have been hand-hoed and weeded six times. Thirty maunds of castor cake was applied in September as a top dressing. A fence of four cart-loads of thorns was made before the rains and the crop was watered for Rs. 12 during five months.

The mill used was a three-roller iron mill. Mr. D'Souza says wooden mills have almost entirely gone out of use. The crop is estimated at 16 annas. The soil is *káli besar*. The outturn is 7,420 lbs. *gol*, 1,266 bundles dry leaves and 140 bundles green tops per acre. The weight of *gol* given is the net actual weight. It is usual, however, to weigh pots (*ghadas*) and *gol* together and make a deduction of $\frac{1}{8}$th on account of the pots. The result is the market weight. The pots usually actually weigh far more than the $\frac{1}{8}$th. The market weight of this produce is 8,086 lbs. Its value is put at Rs. 407-12-9 at 19 lbs. 33 *tolas* per rupee with the pots; add dry leaves at $3\frac{6}{7}$ cwts. per rupee, Rs. 19-4. Mr. D'Souza adds green tops at Rs. 2-3, but it is usual to ignore them because they are always eaten by the bullocks which work the roller. The total value comes to Rs. 427-0-9 and the incidence of assessment 4·02 per cent.

The particulars of outturn are given as follows:—

| | Per 2 gunthas. | Per acre. |
|---|---|---|
| Number of canes ... ... ... | 975 | 19,500 |
| | Lbs. | Lbs. |
| Weight of stripped canes ... ... ... | 3,188 | 63,760 |
| Weight of juice ... ... ... | 2,174 | 43,480 |
| Weight of Gol and pots ... ... ... | 404 | 8,080 |
| Net weight of Gol ... ... ... | 371 | 7,420 |
| Weight of dry leaves (63 bundles) ... ... | 424 | 8,480 |
| Do. green tops (7 bundles) ... ... | 123 | 2,460 |
| Percentage of juice to cane ... ... | 68·19 | |
| Do. Gol to juice ... ... | 17·06 | |
| Do. Gol to cane ... ... | 11·63 | |

Mr. D'Souza thinks that Abráma, Palsána, Pipalgabhán, Ohod and other villages famous for *gol* have been overdone to the great detriment of the soil; and that villages which have lately taken to sugarcane, such as Phadvel, Kachwad, Panchlai, show far better results.

*Experiment No. 112.*—An experiment on *Malbári* sugarcane at Kháparváda by Mr. Mehta. The field measures 11 gunthas and is assessed at Rs. 5-8, or Rs. 20 per acre. It is a Bágáyat rice number. It is partially alienated, the alienee paying only Rs. 4-13 instead of Rs. 5 8. It is leased from the owner by a Koli who "will pay," Mr. Mehta says, "according to the custom of the village Rs. 2 per *vása* equal to Rs. 60 per acre for the sugarcane crop." The soil is *gorádu*, superior* order soil. The seed rate was 1,800 *sántas* (6 *háth* lengths) per acre. Twenty goats were folded for 2 months in the hot season of 1894 in the 11 gunthas, and 20 tons of farm-yard manure per acre was also put on. Then a rice crop was taken and then the cane was planted. The outturn was a 16-anna crop, 8,830 lbs. *gol* net valued, with dry leaves, at Rs. 493-1-10. Incidence comes to 4·05 per cent. The cane was watered from a well which is situated about 260 yards from the field. The particulars of the outturn are thus shown:—

| | Per 2 gunthas. | Per acre. |
|---|---|---|
| Number of canes ... ... ... | 1,245 | 24,900 |
| | Lbs. | Lbs. |
| Weight of canes ... ... ... | 3,735 | 74,700 |
| Do. juice ... ... ... | 2,576 | 51,520 |
| Do. Gol and pots ... ... ... | 502 | 10,040 |
| Do. Gol net ... ... ... | 441½ | 8,830 |
| Do. dry leaves ... ... | 1,120 | 22,400 |
| Do. green tops ... ... | 666 | 13,320 |

* Probably Mr. Mehta says it will fall under Natural Bágáyat at revision, but his will of course depend upon the depth and quality of the water obtainable.

| | Rs. a. p. | Rs. a. p. |
|---|---|---|
| Value of Gol at 19½ lbs. per rupee or Re. 1-12 per maund ... ... ... | 22 13 5 | 456 13 1 |
| Value of dried leaves at Re. 1-8 per hundred bundles ... ... ... | 1 13 0 | 36 4 9 |
| Total ... | ... | 493 1 10 |

| | |
|---|---|
| Percentage of juice to cane ... ... ... | 68·96 |
| Do. Gol to juice ... ... ... | 17 13 |
| Do. Gol to cane ... ... ... | 11·82 |

In estimating the total value of the yield I have again, and always shall, cut out the value of the green tops as they are consumed on the field by the oxen which work the mill.

Mr. Mehta has the following note on the cultivation of sugarcane in the tálukas of Balsár and Chikhli :—

"In the case of *kiaris* a crop of rice is invariably taken before sugarcane is planted. If the rice crop is manured heavily in May, no more manure is given to sugarcane except a top dressing of castor cake in June just before the rains at the rate of about 25 maunds per acre. In the case of *tari* land, superior order or Uttam Bágáyat soil, *san* is ploughed in at the end of July, followed in many cases by a moderate dose of farm-yard manure, say 5 tons per acre, and a top dressing of castor cake in June by well-to-do cultivators.

"The land is ploughed 8 to 15 times in October and November after removing the rice crop. The heavy *champan* or old and rejected upper plate of the sugarcane mill is worked three or four times at intervals to break the clods. Canes are planted whole by means of a *nágar* (the big plough) drawn by 6 bullocks. They are planted 3 or 4 inches* deep. Planting of sets instead of whole canes is understood, but not practised. The cultivators say that though sets require a smaller number of canes to plant an acre than whole canes they still prefer their own method as it is the quicker of the two and does not necessitate the field being inundated at the time of planting. Those fields that are planted in November do not require watering till the middle of February Late planted canes have to be watered to assist germination in January. It is the practice to grow tobacco, melons, &c., in sugarcane fields. Round about the town of Balsár this practice is not now followed to any extent. But in the northernmost villages of Balsár, in the rich Gáikvádi sugarcane growing villages between Amalsád and Bilimora and in the Chikhli táluka, tobacco and other crops are largely grown in sugarcane fields. The yield of tobacco from such fields is worth from Rs. 10 to Rs. 50 per acre. The row of sugarcane next to the tobacco is said to suffer proportionately.

"Sugarcane requires 9 waterings to grow it to perfection, but, as a rule, 6 waterings are given, and if the water-supply is not sufficient for the area planted by different occupants drawing water from the same well, 4 waterings are all that is given from February to May. If the harvesting of Malbári is delayed, it has to be watered once after the Diváli, especially if it has received a heavy top dressing of castor cake. The rows of tobacco are irrigated twice before the first watering is given to the sugarcane. Immediately after each watering the field is hand-hoed to prevent cracks and destroy weeds.

"1,800 canes, *sántas*, each 6 cubits or 9 feet long are required to plant an acre of Malbári and 2,000 of Khajuria canes. Although Khajuria has more nodes, and consequently more eyes, it requires a larger number of canes to plant an acre, because it is planted closer, as it does not tiller so well as the Malbári. Malbári seed canes cost Rs. 35 and Khajuria and Bhuri Rs. 25† per 1,000 canes, each 9 feet long. About 8 to 10 gunthas of seed cane are required to plant an acre. After planting, the field is ploughed lightly to level the surface soil.

"No expert is employed in *gol* making as in the Deccan. Sugarcane is so largely grown that everybody seems to understand the manufacture of *gol*. In

* Other experimenters say 8 inches, but 4 inches is probably correct.
† Mr. D'Souza says Rs. 30.

boiling juice, crushed canes and *tuver* and *juvár* stalks, if available, are used in addition to a small quantity of wood. It takes much more time to boil down the juice to the proper consistency if wood is not used.

"Ratoon crops are never met with. People say that the second year's crop is so poor that it does not pay to keep it, and that in *kiáris* it suffers from the excess of moisture during the monsoon."

Mr. Mehta gives the cost of cultivating an acre of Malbári cane as under :—

*Cost.*

| | Rs. | a. | p. |
|---|---|---|---|
| 12 ploughings in October-November ... ... | 10 | 8 | 0 |
| Digging out and planting canes (1 plough, 6 bullocks, 1 cart and 2 bullocks, and 10 men) ... ... ... | 2 | 8 | 0 |
| 15 tons (45 cart-loads) manure at 12 annas per cart ... | 33 | 12 | 0 |
| Watering 6 times—each time 4 bullocks and 3 men for 5 days. | 30 | 0 | 0 |
| Hand-hoeing 4 times, each time 10 men ... ... | 5 | 0 | 0 |
| Half value of Kos (bag) and ropes ... ... ... | 4 | 0 | 0 |
| Fencing ... ... ... ... ... | 5 | 0 | 0 |
| Castor-oil cake 25 maunds at 8 annas ... ... | 12 | 8 | 0 |
| Crushing cake and applying it—16 men ... ... | 2 | 0 | 0 |
| Cutting canes and making Gol, 12 men at 4 annas, 10 bullocks for 7 days ... ... ... ... ... | 31 | 15 | 0 |
| Wood for boiling juice ... ... ... ... | 32 | 8 | 0 |
| Hire of mill, &c., at Rs. 1½, for 7 days ... ... | 10 | 8 | 0 |
| Earthen pots at Rs. 4 per hundred, including cartage ... | 9 | 0 | 0 |
| 1,800 seed canes (Sántas) at Rs. 35 ... ... ... | 63 | 0 | 0 |
| Sundries ... ... ... ... ... | 10 | 0 | 0 |
| Land assessment, say ... ... ... ... | 15 | 0 | 0 |
| Total ... | 277 | 3 | 0 |

*Produce.*

| | Rs. | a. | p. |
|---|---|---|---|
| 10,000 lbs. Gol (market weight) ... ... ... | 455 | 0 | 0 |
| Radh (dry leaves) 2,500 bundles ... ... ... | 37 | 8 | 0 |
| Green tops ... ... .. ... ... | *10 | 0 | 0 |
| Total ... | 502 | 8 | 0 |

Mr. D'Souza gives here and there at odd places the number of men required to do the various operations and the cost of them. In most cases they differ from Mr. Mehta's estimates, but are sometimes higher and sometimes lower. On the whole, there is not much difference. It must be remembered that sugarcane can be grown much more economically, with of course an inferior yield. Many of the Káliparaj people grow little bits of cane and rely upon its produce "to pay off the Bania." With regard to the yield supposed by Mr. Mehta, 10,000 lbs. *gol*, it is clear that so large an amount is not usually got.

There were 13 old experiments in this táluka, many of them of great value. Mr. Syad Nuruddin Khán's tests on sugarcane are fully dealt with in the printed report for 1890-91. That officer also took 3 tests on tank lands which grow grain and other rabi crops, after the water dries up, and which bear an assessment of about Rs. 2-14-0 per acre, besides giving an irrigation revenue. In one case the incidence was found to be very high, in 2 cases medium. There were three experiments on lands growing castor, and lightly assessed as Jiráyat. The incidence was light. There were three experiments on a first crop of rice by Mr. Doderet. All three fields yielded fairly. The incidence of assessment was very light on one, moderate on another, and high on the third. The assessment of the third field was, however, very high, Rs. 23-0-9 per acre, which points to the fact that frequent crops of sugarcane are obtainable from it.

## CHIKHLI TA'LUKA.

There were 17 experiments done in this táluka, 4 on *juvár* and *tuver* by Mr. Mehta, 6 on rice followed in 4 cases by a second crop by Messrs. D'Souza, Fforde, Mehta and Pránlál, and 3 on sugarcane by Mr. D'Souza. It is a pity there are no experiments on castor seed and *kodra* (Paspalum scrobi-

* Calculated in, because the bullocks have been charged for on the expenditure side.

culatum), both of which are largely grown in Chikhli. *Ragi* (Elusine coracana) also might with advantage have been tested.

*Experiment No. 113.*—An experiment on *juvár* and *tuver* by Mr. Mehta. That officer explains that he undertook to do *juvár* experiments (because Mr. D'Souza went on leave) rather late in the season after the crops on the lighter soils which invariably ripen first had all been cut. Mr. Mehta says: "The soil on which these experiments were made is as good a Jiráyat soil as is met with anywhere and is not the representative of the ordinary shallow soil full of stones or lime nodules which is the characteristic of the Jiráyat soils of Chikhli." The village of this experiment, Degám, belongs to the second group with a dry soil maximum of Rs. 3-8. The field measures 6 acres 26 gunthas and is assessed at Rs. 14-8 or Rs. 2-2-10 per acre. The soil classification* annas in original survey are 11½ with no subsoil annas. But the field is large and varies in quality, and the classification annas of the piece experimented on were 13.

The crop is estimated as a 20-anna one. The season is said to have been most favourable owing to the short rainfall and a heavy shower at the Diváli. The cultivation is described by Mr. Mehta as "extra good, having been manured." Six loads of manure were put on in May. This does not seem a very large dressing. The seed rate given is 4 to 5 lbs. *juvár*, 1 to 3 lbs. *tuver*, and ¼ to 1 lb. *choli* and *mug*. These seed rates appear rather low. The yield of grain was 928 lbs. *juvár* and 66 lbs. *tuver* plus 285 bundles *kadbi* and 65 lbs. *tuver* leaves, &c., the whole valued by Mr. Mehta at Rs. 30-5-6. Mr. Mehta values *juvár* at 43¼ lbs. per rupee, *tuver* the same, *kadbi* 100 bundles per Rs. 2-8, and *tuver* leaves 250 lbs. per rupee. The fodder is priced, in my opinion, far too high. Mr. Mehta says further on: "Grass is cheap in this táluka. Fairly good grass is sold for Rs. 4 per 1,000. *Kadbi* is not much thought of." How then he can value it higher than it is valued in the Surat Bazár I do not understand. On enquiry I find that about 8 annas per 100 bundles is a proper rate, and, substituting † this price for Mr. Mehta's, the total value comes to Rs. 24-10-5 and the incidence to 8·83 per cent. *Tuver gotar* or leaves and husk is also priced very high at 250 lbs. per rupee. The usual price is about 10 maunds the rupee, or between 350 to 400 lbs. However, the amount is trifling.

*Experiment No. 114.*—An experiment on the same two crops by the same experimenter at Bámanvel. The field measures 8 acres 11 gunthas and is assessed at Rs. 12 or Rs. 1-7-2 per acre. This field also varies a good deal in quality. As a whole, it is classed at 9 annas and the piece tested at 11.

The soil is the same as in the case of the last experiment, black soil more or less mixed with lime; the portions experimented on had no lime. The anna valuation is 20. The cultivation is described as "good, same as the ordinary Jiráyat cultivation anywhere else." The seed rate is the same as in the last case. No manure was applied. Outturn comes to 603 lbs. *juvár* and 255 lbs. *tuver* with 245 bundles of *kadbi* and 170 lbs. *tuver* refuse, the whole valued at Rs. 21-11-9. Incidence works out to 6·66 per cent.

The first of these fields has grown *juvár* and *tuver* or *kodra* and *tuver* for many years. The second field was only broken up for cultivation in 1892-93 and since then has grown *juvár* and *tuver* or *kodra* and *tuver*.

*Experiment No. 115.*—A field at Edhal measuring 2 acres and assessed at Rs. 5 or Rs. 2-8 per acre, a field with a uniform surface, classified at 13 annas.

The field has grown cotton, but is usually under *juvár* and *tuver*, some of it sometimes lying fallow. The crop is estimated at 18 annas. The soil is the same as in the other fields. No manure was applied. The cultivation is ordinary. The outturn comes to 691 lbs. per acre *juvár* with 213 lbs. *tuver*, 190 bundles *kadbi* and 130 lbs. *tuver* refuse, valued at Rs. 22-6, the incidence coming to 11·17 per cent.

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* The classification was re-done especially for this report and the old classification was found correct, except in the case of Edhal where the old number has been divided by a road, formed into two numbers now, and classed *de novo*.

† In each of Mr. Mehta's *juvár* experiments I have lowered his figures in this way.

*Experiment No. 116.*—A field at Minkachh. It measures 3 acres 17 gunthas and is assessed at Rs. 16-3 or Rs. 4-11-7 per acre. In the assessment is included Rs. 5-10 for well water, there being an old well. The old classification annas for this number are available. For neighbouring numbers the classification varies from 12 to 14 annas and this field is classed at 14 annas and its classification has been confirmed for the bulk of the field. The soil is assessed at Rs. 3-1-4 at present deducting the well *kasar*. Neither in this nor in any of the three other fields is there any subsoil classification at revision.

For the last few years the field has grown the *juvár* mixture with an occasional patch of *nágli* (Elusine coracana) or drilled rice. The anna estimate of this year's crop is 18; soil, cultivation and seed rate are the same as in the other fields. No manure was applied. The total outturn comes to 757 lbs. *juvar* and 525 lbs. *tuver* with 280 bundles *kadbi* and 382 lbs. *tuver* refuse valued in all at Rs. 32-8-11. Incidence works out to 14·50 per cent. If we deduct the well *kasar* the incidence would work out to 9·47 per cent.

I give a table showing these fields :—

| Village. | Yield. | Crop of test. | Value of gross produce per acre. | Assessment per acre (original survey). | Percentage incidence of assessment. | Bhág annas (revision survey). | Assessment per acre (revision survey). |
|---|---|---|---|---|---|---|---|
| | | | Rs. a. p. | Rs. a. p. | | | Rs. a. p. |
| Degám ... ... | Survey No. 912 (Exp. No. 113) | Juvár and Tuver. | 24 10 5 | 2 2 10 | 8·83 | Soil 11½ | 2 8 3 |
| Bámanvel ... ... | Survey No. 113 (Exp. No. 114) | Do. ... | 21 11 9 | 1 7 2 | 6·66 | Soil 9 | 1 11 0 |
| Edhal ... ... ... | Survey No. 336 (Exp. No. 115) | Do. ... | 22 6 0 | 2 8 0 | 11·17 | Soil 13 | 2 13 6 |
| Minkachh ... ... | Survey No. 217 (Exp. No. 116) | Do. ... | 32 8 11 | 4 11 7<br>* 3 1 4 | 14·50<br>* 9·47 | Soil 14 | 3 1 0 |

* Without well rate.

The maximum rates taken are Rs. 3-8 for soil for Degám, Edhal and Minkachh and Rs. 3 for Bámanvel, the present rates, no proposals for revision rates being known. As usual, of course the application of the distance scale will slightly alter the revision survey rates from those now given. If the present maximum rates are retained, the assessment seems very light.

In giving the outturn results Mr. Mehta has added in the Edhal and Minkachh experiments 10 lbs. *juvár* grain per 8 gunthas for what is known as *Ponkh*, that is to say, the heads plucked when not quite ripe and eaten fresh roasted. No *Ponkh*, Mr. Mehta says, was eaten in the case of the other two fields.

Comparing these experiments with those recorded in the northern tálukas, two points are very noteworthy. The highest maximum for 16 annas in the Chikhli táluka in the case of Jiráyat soils is now Rs. 3-8. It is double that in Chorási. Mr. Mehta's remark about these particular soils being as good as any dry crop soils in the district can, I think, hardly be correct. Still at present the incidence of assessment is very much lighter here than in the north. The four experiments in Chikhli give an average outturn of Rs. 25-5-6 and an incidence of 10·68 per cent. Finding out what a proportionate 16-anna crop is in Chikhli, we have the crop worth Rs. 21-7-2 and an incidence of 12·58 per cent. The second point that is noteworthy is the excellence of the *tuver* compared with the miserable outturn of that pulse in other tálukas.

The next experiments I take are those on rice and rice followed by a second crop.

*Experiment No. 117.*—The area of the Pot number tested is 16 gunthas assessed at Rs. 4-12, of which Rs. 1-9-7 are for tank assistance, or Rs. 11-14 per acre. The rice tested is *Kolamb* priced at 38½ lbs. per rupee or Re. 1 per maund which is the same price as that taken by me in Bárdoli. The cultivator is a Boráh and the cultivation described as good. Of the soil the experimenter, Mr. D'Souza, says : "The soil is a dark brown variety, like most of the rice soil in Chikhli táluka ; it is mixed with a fair proportion of clay and is deep and re-

tentive of moisture It contains, however, an admixture of nodules of limestone and is hence popularly known as *dádrirráli*. The abundance of such limestone is alleged by the villagers as the reason why no second crop can be raised with success in this and many surrounding fields." As a matter of fact there appears to be a second crop sometimes. There was one this year, but it was found impossible to get to the field to test it. The seedlings were raised in a rábed bed 3¾ gunthas in area on which was sown about 1¼ maunds of seed. The acre average comes to 9·4 gunthas of seed-bed and 128 lbs. of seed, an area and amount which, as I have often observed, would not be necessary if so much as an acre were actually planted. The ráb materials were 4 loads of cattle manure with a layer of one load of *kodra* stalks. This was set fire to and on it 2½ loads of pure dung were spread. The seed-bed was then ploughed and the seed broadcasted over it at the first rains. The seed was covered in with another plough and the whole levelled. It was not found necessary to weed * the seed-bed. The seed-bed appears to have been in another field.

The permanent bed of 16 gunthas was manured with 7 loads of farm-yard manure. A preliminary ploughing was given to it in June and it was puddled, before transplanting the seedlings into it, by two ploughings and two levellings. It had to be hand-weeded in September. The field was watered twice from the tank, at the beginning and at the end of September. The total outturn, estimated as an 18-anna crop, was 2,852 lbs. grain and 3,800 bundles straw per acre valued at Rs. 83-9-3. Incidence works out to 14·20 per cent. which is light.

Alipor is a village of group II at present with maximum rates for rice lands of soil Rs. 5 and water Rs. 8, a possible highest † of Rs. 13.

*Experiment Nos. 118 and 119.*—Experiments on *Kolamb* rice by Mr. D'Souza and *láng* by Mr. Mehta at Ránkuva, a village of present group IV. Maximum rates for rice Rs. 2-12 for soil and Rs. 7-8 for water.

The field measures 1 acre 2 gunthas and is assessed at Rs. 11, including Rs. 3-15 for tank water, or Rs. 10-7-7 per acre. The soil is black soil. On 39 gunthas of the field *Kolamb* rice was grown and on the remaining 3 *Sukhvel*. For the former 2¼ maunds of seeds were sown on a manured seed-bed of 10 gunthas, giving a seed rate of 89 lbs. sown on 10·25 gunthas of seed-bed per acre. The seed rate is rather low and the area of the seed-bed very large. This seed-bed was in part of the field and was afterwards planted with seedlings like the rest. It is said to have been manured with 8 loads of manure. It had to be weeded twice. The rest of the field, 29 gunthas, is said to have been manured with 22 loads of farm-yard manure mixed with sweepings and rubbish. It had to be weeded twice, once at the end of August and once in the middle of September. The season was one of scantier rainfall than usual, but Mr. D'Souza does not say to what extent, if any, the tank water was used. The outturn, a 14-anna crop, was 2,015 lbs. grain and 3,000 bundles straw per acre valued at Rs. 59-14-3.

Mr. Mehta tested the second crop *láng*. The field has had a second crop at any rate for the last 6 years and the second crop was *láng* on all but one occasion. The yield was this year poor. Mr. Mehta calls it only a 3-anna crop, although he states that the late rains about the Diváli were highly favourable. They were, I expect, hardly sufficient to counteract the bad effects of the very slight fall of August and September. Thirty pounds of seed per acre were put on, drilled. The yield comes to only 176 lbs. pulse per acre with 65 lbs. leaves and 155 lbs. stalks valued at Rs. 4-1-4. The value of the double yield comes to Rs. 63-15-7 and the incidence of assessment to 16·37 per cent.

*Experiment Nos. 120 and 121.*—Experiments on *Kolamb* rice by Mr. D'Souza and *vál* and *san* by Mr. Mehta at Surkháí, a village of the same class and with the same rates as Ránkuva. The field under test forms part of Survey No. 125, the whole field measuring 32 gunthas and assessed at

* It is not usually necessary to weed rábed seed-beds.

† Where I give a possible highest for rice land thus it is only in case there is perennial tank water which is very rare. With the ordinary Surat tank the highest possible assessment is found by adding up the soil and water maximum rates; thus for this field Rs. 13. This remark applies to all cases where I quote highest possible for rice lands.

Rs. 8, including Rs. 3 for tank water, or Rs. 10 per acre. The soil is black soil and the field has, six years out of ten, grown a second crop, usually of *vál*. The *kiári* tested measurss 16 gunthas. Seedlings for this piece were raised on a bed of 3 gunthas in a portion of another field. Thirty *sers* of seed were sown giving an acre average rate of 72 lbs. of seed sown on 7½ gunthas of seed-bed. The seed-bed was manured with 4 loads of manure. It was not weeded, but was found very foul at the time of transplantation, and it was rather a troublesome job to free the seedlings from weeds and rubbish.

The permanent bed of 16 gunthas was manured in June with 8 loads of farm-yard manure. Mr. D'Souza continues :—"Immediately after transplanting, the cultivator sowed broadcast 2 maunds of *san* seed at 2 maunds the rupee, then filled the *kiari* with water so as to make the *san* seed rot and form manure at the roots of the seedlings; in 8 days all the seed was completely decomposed." The field was weeded three times. The field was once watered from the tank; it needed a second watering, but water failed in the tank. The outturn, a 16-anna crop, was 2,645 lbs. grain and 3,104 bundles of straw per acre valued at Rs. 76-8-4.

The rice crop was followed by a mixed crop of *vál* and *san*. The combined crop was estimated as a 10-anna one. Seed sown was 35 lbs. *vál* and 5 lbs. *san* per acre drilled. Outturn came to 92 lbs. *vál* and 455 lbs. *san*. Mr. Mehta gives the byproduct at 480 lbs. *vál* leaves, &c., and 240 lbs. stalks. This seems a very large amount of byproduct compared with the grain outturn, but there is no reason to doubt its correctness, for *vál* varies so greatly in the proportion of leaves and seed. The *san* is priced at 68 lbs. per rupee, which is rather higher than what Mr. D'Souza gave, 2 maunds or 77 lbs. per rupee. The whole of the second crop is valued at Rs. 11-13-9 and the total of the two crops comes to Rs. 88-6-1 and incidence of assessment to 11·31 per cent.

I may here note that while Mr D'Souza calls this soil *káli* (black), Mr. Mehta says it is *besar* (middle colour). It is not likely that the soil is true black soil and Mr. D'Souza has himself said that most of the Chikhli rice soils are dark brown.

*Experiment Nos. 122 and 123.*—Both rice, *Kada*, and *vál* were tested by Mr. Pránlál Harkisandás. As in the other experiments taken by this officer he practically tells us nothing about them. The field measures 1 acre 3 gunthas and is assessed at Rs. 8-8 or Rs. 7-14-6 per acre. There is no tank. About 50 cart-loads of ordinary manure were applied, it is said, to the number, including the seed-bed which was in the field. This seems a considerable exaggeration, but Mr. Pránlál offers no comment. The soil is *káli máti*, black soil. The cultivation is said to be good, and 130 lbs. seed per acre were used. Whether the seed-bed was rábed or not is not stated. The yield, a 14-anna crop according to the experimenter, was 2,290 lbs. grain and 4,640 lbs. straw.

The seed rate of the *vál* crop is not given. It was an excellent crop. No separate anna estimate has been given unless Mr. Pránlál means that 14 annas represents the double crop. The *vál* outturn came to 1,157 lbs. pulse and 555 lbs. *gotar* or leaves and husks per acre.

Mr. Pránlál values *Káda* rice and *vál* both at 45½ lbs. per rupee and *vál* fodder at 150 lbs. The valuation calculated thus comes to Rs. 86-1-2 per acre. The price of the fodder may stand, but I cannot accept the price of the grain as correct. I shall take 51½ lbs. for *Kada* rice and 57½ lbs. for *vál**, which are, I am sure, the correct rates, at any rate very approximately. Mr. D'Souza gives 54 lbs. per rupee for *Kada* in Párdi and 50½ lbs. in Balsár, and my rate at Bárdoli and Jalálpor was 12 annas the maund or 51¼ lbs. per rupee.

At the rates I take the *vál* crop was worth Rs. 23-13-1 and the rice crop Rs. 51-1-5 or together Rs. 74-14-6. The incidence of assessment comes to 10·55 per cent. which is low.

Thála is a village of group II and its present maximum rates for rice lands are for soil Rs. 5 and for water Rs. 8.

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* Mr. Pránlál himself takes 57½ lbs. in his other *vál* tests, and I cannot help supposing this 54½ lbs. must be a pure slip.

*Experiment Nos. 124 and 125.*—An experiment by Mr. Fforde, Gujarát Survey, on *Sukhvel* rice followed by *val* which was tested by Mr. Mehta. The area of the field is 1 acre 8 gunthas and its assessment Rs. 12, of which Rs. 4-8 is for tank water, or Rs. 10 per acre. Mr. Fforde says the field is sublet by a Chikhli Pársi for Rs. 17, the Pársi of course paying all Government dues. The field used to be sublet for Rs. 25, but the rent is now reduced, the people say owing to the fall in the price of rice. The soil is said to be "*besar* with a little lime and salt, not so retentive of moisture as in" the next experiment. The cultivation is said to be 'indifferent sparse crop.' Perhaps it is hardly fair to call the cultivation indifferent merely because the crop was not very good, for the season is characterised as one of 'short rainfall.' And of the manure Mr. Fforde says: "30 cart-loads per acre, of which 15 to 20 of pure farm-yard manure are mixed with 3 to 4 gunthas for seed-bed. The rest is mixed manure and is spread over the whole field." This is surely liberal enough treatment. But the rate for the seed-bed is, as in the next test, most excessive.

The seed rate is not given, but seed is said to cost Rs. 3-8-8 per acre which makes the seed-rate rather more than in the next experiment, say 127 lbs. per acre applied to 3 gunthas of seed-bed.

The field of this experiment lay higher than that of the next and had less natural drainage into it. To this field the tank assistance which it gets is much more valuable than to the other. It was, however, flooded once about 19th October. The crop is called an 8-anna one. The grain outturn was 1,238 lbs. per acre and the straw 6,880 lbs. valued together at Rs. 41-3-10. The rice, *Sukhvel*, is valued the same as *Kolamb*; both are a little high. The straw is valued here at $13\frac{3}{7}$ cwts. per rupee, about one-third as much again as *Kolamb* straw is to be had for a rupee; I do not quite know why, nor does Mr. Fforde explain. Mr. Fforde gives the cost of cultivation here as Rs. 15-10-8 per acre.

The second crop, one appears to be always taken, was *val*. Sixty pounds of seed per acre were sown broadcast. The outturn is estimated by Mr. Mehta at 6 annas. It comes to 347 lbs. pulse per acre with 270 lbs. leaves, &c., and 150 lbs. stalks, the whole valued at Rs. 8-1. The total value of the double crop comes to Rs. 49-4-10 and the incidence 20·28 per cent.

The village of experiment, Harangám, belongs to the present group IV and its maximum rice rates are Rs. 2-8 for soil and Rs. 7-8 for water.

*Experiment No. 126.*—This is an experiment on *Kolamb* rice by Mr. Fforde. The whole field measures 1 acre 8 gunthas and is assessed at Rs. 10, including Rs. 2-5-6 for tank water, or Rs. 8-5-4 per acre. Of the whole field 34 gunthas are sown with *Kolamb* and the rest with *Sukhvel* rice. Mr. Fforde does not give the amount of seed, but says it cost Rs. 3-3 per acre which appears to be the price of 3 maunds or $114\frac{1}{2}$ lbs. With regard to manure Mr. Fforde says: "33 cart-loads per acre—15 to 20 carts of farm-yard manure only in seed-bed of 3 to 4 gunthas. The rest of the manure is mixed with straw and ashes, &c., and is inferior. This inferior manure to the extent of 13 to 18 cart-loads is spread over the remaining area. The manure is applied in May, before sowing before rain falls. Only that portion which is applied to the seed-bed is ploughed in. The rest is top dressing." Elsewhere Mr. Fforde gives the price of manure as Rs. 12-6 per acre. There is of course some mistake about the amount of manure applied to the seed-bed, as it is about five times as much as usual.

The field lies very low and catches a great deal of rain water, but the soil has lime in excess and the people say this damages the second crop of *láng* or *val*, and castor is never sown. Tank water is said to have been taken only once about 10 days before reaping, and Mr. Fforde says the tank assistance would probably not have been required at all had rain not held off.

This field and another, measuring together 2 acres 2 gunthas and assessed together at Rs. 19-4, are said to be let out by the owner, a Boráh, for Rs. 34, the Boráh paying all assessment and Local Fund. He thus gets only Rs. 3-9 profit or Rs. 1-12 about per acre. The outturn is called a 12-anna crop. It is 1,813 lbs. grain and 6,830 lbs. straw per acre and is valued at Rs. 59-12. Mr Fforde explains that both grain and straw were dried for 15 days. *Kolamb* rice is

valued at Re. 1-1 per maund or 33¾ lbs. per rupee which is a little high perhaps. I think one anna per maund too high. Incidence of assessment on the rice comes to 13·94 per cent. Mr. Fforde says his *ser* is 35 *tolas*. The common Surat *ser* is 37½ *tolas*. Mr. Fforde replies in answer to a reference that he used a *measure ser* of 35 *tolas* and that the grain is bought and sold by this measure. This is certainly not the case in the vast majority of Surat villages. It does not much matter, as it does not affect the result in pounds.

The experimenter says the people gave the following estimate of expenses for the field :—

| | Per acre. | | |
|---|---|---|---|
| | Rs. | a. | p. |
| Manure ... ... ... ... | 12 | 6 | 0 |
| Seed ... ... ... ... | 3 | 3 | 0 |
| Ploughing and transplanting ... ... | 3 | 2 | 0 |
| Sowing ... ... ... ... | 1 | 8 | 0 |
| | 20 | 3 | 0 |

add to this assessment at Rs. 8-5-4 and total expenses come to Rs. 28-8-4, leaving a profit of Rs. 31-3-8 per acre, which is probably far more than is actually obtained, I expect. These vague estimates are, however, rarely of any use. There appears to be a second crop most years in this field. This year there was not Nevertheless the incidence of assessment is very light. In all probability the second crop is not very valuable.

Bámanvel belongs at present to group III and its rates for rice land are Rs. 3-12 for soil and Rs. 7 for water.

*Experiment No. 127.*—An experiment on Malbári sugarcane by Mr. D'Souza at Phadvel. The field measures 2 acres 6 gunthas and is assessed at Rs. 22-8 or Rs. 10-7-5 per acre. There is no special water rate, as the number was classed as Bháta Bágáyat or Natural Bagáyat. The land is black soil and is really rice land growing sugarcane about every two or three years in part of the field. The maximum rate for Natural Bágáyat in this village is Rs. 8-12 for 16 annas.

Mr. D'Souza thus describes the cultivation, &c. :—

"This number belongs to one Daya Ranchhod who has holdings in the village assessed at about Rs. 400 per annum. He cultivates all his land by means of *halis*.* An average acre of sugarcane growing *kiári* can be sublet for Rs. 40† in this village, the Kháteddár paying the assessment.

"In the month of Chaitra-Vaishákh (April-May) 20 cart-loads of pure cattle-dung were applied to the field. Two ploughings and one levelling were given to it at the first rains, and rice known as *Kowchi* was sown broadcast. It was harvested in Ashvin (October). It fetches about Re. 1-8 less than *Kada* per *gáli* of 31½ maunds.

"After the rice was harvested, 5 ploughings and cross-ploughings with two applications of the *champan* or log harrow were given to the field during October. Cane was then planted by *nágar* (large plough) at the rate of 1,250 ‡*sántas* per Bigha at Rs. 30 per thousand *santas*. Immediately after planting it was watered by *kos*§ ; only one *kos* of the Rámio kind was employed. Six days after this it was hand-hoed by the *kudali* and weeded. The next watering was given in Fágan (February). In all six waterings and two more hand-hoeings and weedings were given till the rains. In Bhádarva (September) last two *khandis* of castor cake were applied as a top dressing at Rs. 8 per *khandi*. A fence was made with 5 cart-loads of thorns and it was watched for 4 months from Akhád to Ashwin (July to October) at Rs. 3 per month ; crushing was done in the usual way by a three-roller iron mill."

* Private servants or serfs.

† Mr. D'Souza does not say but it appears that this is only for the one year's cane, not so much would be obtained for a continuous lease.

‡ 1,875 units of 6 *hathe* of cane each per acre.

§ Leather bag used to take the water out of the well.

The outturn figures are thus given :—

| | Per 2 gunthas. | Per acre. |
|---|---|---|
| Number of canes ... ... | 1,140 | 22,800 |
| | Lbs. | Lbs. |
| Weight of stripped canes ... ... | 3,933 | 78,660 |
| Weight of juice ... ... ... | 3,007 | 60,140 |
| Weight of Gol and pots (market weight) ... | 527 | 10,540 |
| Net weight of Gol ... ... ... | 475 | 9,500 |
| Weight of dry leaves ... ... | 589 | 11,780 |
| Weight of green tops ... ... | 346 | 6,920 |
| | Rs. a. p. | Rs. a. p. |
| Price of Gol at Rs. 1-10 per maund ... | 22 4 2 | 445 4 0 |
| Price of dry leaves at Rs. 1-8 per 100 bundles ... ... ... ... | 1 0 4 | 20 6 5 |
| Total price ... ... ... | 23 4 6 | 465 10 5 |

| | |
|---|---|
| Incidence of assessment ... ... ... | 2·25 per cent. |
| Percentage juice to cane ... ... ... | 76·45 |
| " Gol to juice ... ... ... | 15·79 |
| " Gol to cane ... ... ... | 12·07 |

The percentage of *gol* obtained was very favourable. The crop is estimated at 18 annas.

*Experiment No. 128.*—Another test by the same officer on the same variety of cane, this time at the village of Pipalgabhán. The field measures 3 acres 36 gunthas and is assessed at Rs. 41 or Rs. 10-8-2 per acre. It is classed as Natural Bágáyat. The Khátedár cultivates himself. He has land paying a land assessment of about Rs. 600 and about 50 head of cattle. Mr. D'Souza says that most Khátedárs cultivate their own holdings themselves, and subletting for cane cultivation is the exception. When done, a rent of Rs. 45 per acre for the year is taken, the Khátedar paying the assessment.

About 40 loads of manure per acre were applied in the hot weather, and *san* seed was broadcasted at the rate of 2½ maunds per acre. The *san* was ploughed in as green manure. Fifteen ploughings and cross ploughings with 5 levellings are said to have followed. Cane was planted by the plough in the month of December at the rate of 1,875 *sántas* per acre at Rs. 30 per thousand. The field was not watered till February; after that about once a fortnight. In all 10 waterings and 5 hand-hoeings were given till the rains, which is liberal. No top dressing of castor-oil cake was given. A fence of 16 cart-loads of thorns was made and the crop was watched by two men for 5 months. Crushing was done in the usual way with a three-roller iron mill.

The following are the outturn figures :—

| | Per 2 gunthas. | Per acre. |
|---|---|---|
| Number of canes ... ... ... | 900 | 18,000 |
| | Lbs. | Lbs. |
| Weight of stripped cane ... ... | 3,978 | 79,560 |
| Weight of juice ... ... ... | 2,853 | 57,060 |
| Market weight of Gol ... ... ... | 466 | 9,320 |
| Net weight of Gol ... ... ... | 408 | 8,160 |
| Weight of dry leaves ... ... ... | 451 | 9,020 |
| Weight of green tops ... ... ... | 346 | 6,920 |
| | Rs. a. p. | Rs. a. p. |
| Price of Gol at Rs. 1-10 per maund ... | 19 11 3 | 394 1 0 |
| Price of dry leaves at Rs. 1-8 per 100 bundles.. | 0 15 4 | 19 2 2 |
| Total value of produce ... ... | 20 10 7 | 413 3 2 |

Incidence of assessment (two years' assessment taken) 5·08 per cent. or for one year 2·54 per cent. Mr. D'Souza took two years' assessment on the ground that the sugarcane crop lasted practically two years. Such land, however, generally bears a crop of rice as well as one of sugarcane in the two years.

| | |
|---|---|
| Percentage of juice to cane ... ... ... ... | 71·71 |
| " of Gol to juice ... ... ... ... | 14·30 |
| " of Gol to cane ... ... ... ... | 10·25 |

The percentage results are very fair. The crop is estimated at 16 annas.

With regard to the field itself Mr. D'Souza says:—The soil is a rich loamy mould, deep chocolate in colour. The field was watered from a *pakka* well, although a good deal of sugarcane is also irrigated in the village from the adjoining *khádi* by *dhekudiát*. The rotation of crops is shown by the following extract from Village Form No. III, part I:—

1. Sugarcane (*ummed, i.e.*, just planted).
2. Sugarcane (*rasida, i.e.*, full grown).
3. Rice and *vál*, 1 acre 20 gunthas, *guvár* 32 gunthas, *tuver* 32 gunthas, *vál* 32 gunthas.
4. *Kodra* 1 acre 38 gunthas, *tuver* 1 acre 20 gunthas, *guvár* 18 gunthas.
5. Sugarcane (*ummed*) 3 acres 21 gunthas, tobacco 15 gunthas.
6. Sugarcane (*rasida*).
7. Rice 2 acres, *tuver* 36 gunthas, *guvár* 1 acre.
8. Rice and *vál* 36 gunthas, ginger 2 acres 20 gunthas, onions 10 gunthas, castor 10 gunthas.
9. Sugarcane (*ummed*).
10. Sugarcane (*rasida*).

The question is whether land such as this should be classed now as Natural Bágáyat without caring whether its water comes from a well or from a *dhekudi*. Why not?

*Experiment No. 129.*—An experiment similar in every way at Ohod. The field measures 1 acre 22 gunthas and is assessed at Rs. 25-8 or Rs. 16-7-2 per acre. It is classed as Bháta or Natural Bágáyat and is really rice land growing sugarcane once in 5 or 6 years. The soil is said to be black soil. The Kháteddr is the Patel of Degám and he has sublet the field to a Koli, the terms being that the Koli should pay Rs. 22 for taking a crop of rice from the whole number, and Rs. 22 per Bigha, Rs. 33 per acre, for the crop of sugarcane. The Kháteddr thus receives Rs. 74 from the Koli and has to pay Rs. 54-3 assessment and Local Fund for the two years.

In the hot weather of 1894, 40 loads of manure per acre were put on the field and a crop of inferior rice called *Kamdi* was harvested. Then the field was prepared for cane by 8 ploughings and 4 levellings. Cane was planted in November at the usual seed rate, 1,875 *santas* per acre, costing Rs. 35 per thousand *sántas*. Planting was immediately followed by watering and about 15 days after by hand-hoeing and weeding. The next watering was given in February and after that 8 waterings till the rains, and 4 hand-hoeings and weedings. Two *khandis* of castor cake were applied as a top dressing in September over half the number; but none is said to have been applied to the portion under experiment, because it had been well manured as a seed-bed for the rice seedlings. A fence of 10 cart-loads of thorns was made in June and the crop was watched by one man for 4 months for Rs. 5. Crushing was done in the usual way; but the mill was a wooden one and there are hardly any iron mills in the village. The crop is estimated as an 18-anna crop. The village belongs to the second class, and Bháta or Natural Bágáyat maximum rate is Rs. 11-8.

The outturn figures are:—

| | Per 2 gunthas. | Per acre. |
|---|---|---|
| Number of canes ... ... | 1,200 | 24,000 |
| | Lbs. | Lbs. |
| Weight of stripped canes ... ... | 4,044 | 80,880 |
| Weight of juice ... ... | 2,764 | 55,280 |
| Market weight of Gol ... ... | 544 | 10,880 |
| Net weight of Gol ... ... | 463 | 9,260 |
| Weight of dry leaves ... ... | 397 | 7,940 |
| Weight of green tops ... ... | 346 | 6,920 |
| | Rs. a. p. | Rs. a. p. |
| Price of Gol at Rs. 1-10 per maund ... | 22 15 7 | 459 7 6 |
| Price of dry leaves at Rs. 1-8 per 100 bundles ... ... ... | 0 14 10 | 18 9 7 |
| Total value of produce ... ... | 23 14 5 | 478 1 1 |

| | Per cent. |
|---|---|
| Incidence of assessment ... ... ... | 3·44 |
| Percentage of juice to cane ... ... | 68·34 |
| Do. Gol to juice ... ... ... | 16·75 |
| Do. Gol to cane ... ... ... | 11·44 |

I add averages for the three experiments on Malbári sugarcane in Chikhli :—

| | Per acre. Lbs. | | |
|---|---|---|---|
| Net weight of Gol ... ... ... | 8,973 | | |
| | Rs. | a. | p. |
| Value of crop... ... ... ... | 452 | 5 | 3 |
| Assessment ... ... ... ... | 12 | 7 | 7 |
| Percentage juice to cane ... ... ... | 73·40 | | |
| Do. Gol to juice ... ... ... | 15·61 | | |
| Do. Gol to cane ... ... ... | 11·26 | | |
| Incidence of assessment on value of crop of ... | 2·76 | | |

## PA'RDI TA'LUKA.

There were six experiments on rice followed in each case by *vál*. Mr. Mehta took all the second tests, and except one done by Mr. Pránlál Harkisandás, Mr. D'Souza did all the first. There were 3 experiments on *nágli* by Mr. D'Souza and one on castor by Mr. Mehta and there were 4 experiments on sugarcane by Mr. D'Souza. The táluka has not been re-classed.

I first take the experiments on rice and *vál*. With one exception the rice was always *Kada* rice. Mr. Mehta selected the fields for Mr. D'Souza's experiments.

Mr. D'Souza says : " Mr. Mehta appears to have been handicapped in his choice by the fact that a good deal of rice had been cut before he commenced his tour. The fields he has selected, however, I have invariably found fairly representative of the area remaining uncut, but it is doubtful whether they may be taken as fair samples of the whole crops of their respective villages."

*Experiment Nos. 130 and 131.*—Rice followed by *vál*. The field measures 1 acre 4 gunthas and is assessed at Rs. 7 or Rs. 6-5-9 per acre. The soil is black soil and there is no irrigational facility. The rainfall was rather scanty, but a second crop was grown and appears to be grown every year. The cultivation is described as good. Three and a half maunds of seed are said to have been sown on a seed-bed measuring 9 $\frac{13}{67}$ gunthas giving an average seed rate of 127 lbs. on about 9 gunthas of seed-bed per acre ; of the seed-bed 3$\frac{7}{8}$ gunthas was *rohium* or unrábed and the rest *adhar* or rábed. The rábed bed is generally preferred in Párdi, because the process of burning kills all the weeds. The Párdi táluka, it must be remembered, is geographically a part rather of the Konkan than of Gujarát. Six cart-loads of manure are said to have been applied to the *rohium* portion of the seed-bed and 20 loads to the rest of the field. The outturn was 2,132 lbs. grain and 3,200 bundles of straw per acre worth Rs. 43-7-6. I have calculated the rice straw at the rate, as ascertained from the táluka, of Re. 1-4 per thousand bundles. The grain is valued by Mr. D'Souza at 54 lbs. per rupee.

The second crop of *vál* was tested by Mr. Mehta. It was broadcasted at the rate of 60 lbs. per acre. The outturn is said to be a 16-anna crop by that officer. It amounted to 809 lbs. pulse and 573 lbs. of *gotar*, leaves and husk, with 339 lbs. stalks valued at Rs. 18-0-5. Here again I may note that Mr. Mehta calls the soil *besar* and Mr. D'Souza black (*káli*). The total value of the double crop is Rs. 61-7-11 and the incidence of assessment is 10·34 per cent.

Maximum rice rates for Umarsádi (group II) are for soil Rs. 3 and for water Rs. 9.

*Experiment Nos. 132 and 133.*—Similar experiments at Bálda. The whole number measures 2 acres 15 gunthas and is assessed at Rs. 14-8 or Rs. 6-1-8 per acre. There is no tank. The field is divided into Pot numbers and the rice was tested in one and the *val* in another. The average rate of assessment has therefore been calculated on the whole number and not on the Pot number.

The seed-bed was rábed. The Pot number into which the rice seedlings were transplanted was 25 gunthas and it received 15 loads of manure, 24 per acre. The seed rate comes to 74 lbs. per acre. The soil is said to be black by Mr. D'Souza and *besar* by Mr. Mehta. The crop is estimated at 14 annas and the outturn was 1,837 lbs. grain and 3,300 bundles straw per acre valued at Rs. 38-2-5.

Sixty pounds per acre of *val* seed were broadcasted and produced a 12-anna crop, 615 lbs. pulse and 520 lbs. *gotar* with 330 lbs. stalks worth in all Rs. 14-10-10. The value of the double crop comes to Rs. 52-13-3, and the incidence of assessment to 11·55 per cent.

Maximum rates are the same as those for Umarsádi.

*Experiment Nos. 134 and 135.*—Another experiment of the same sort at Sodhalváda. The field measures 3 acres 30 gunthas and is assessed at Rs. 17 or Rs. 4-8-6 per acre. A second crop, generally *val*, is grown every year. There is no tank. The cultivation is described as indifferent. Seedlings were raised on a rábed bed, 12 gunthas in size, and the seedlings from this were transplanted into 2 acres 14 gunthas. Five maunds of seed were sown and this gives a seed rate of 81 lbs. of seed on a seed-bed of 5 gunthas per acre of transplantation. The seed-bed was manured with six loads of cattle dung supplied by the cultivator's own cattle, about 8 in number. The main rice field was unmanured for fear lest the mortgagee of the number, a Sávkár, should demand higher rent, or oust him from his field if he improved it by manuring. The field was not weeded. The outturn of grain, a 12-anna crop, was 1,656 lbs. and of straw 3,600 bundles per acre worth together Rs. 35-2-8.

The *val* was estimated only at 5 annas by Mr. Mehta. The seed was broadcasted, 60 lbs. per acre. The outturn was 244 lbs. pulse, 240 lbs. *gotar* and 126 lbs. stalks per acre worth Rs. 6-0-7. The value of the double crop was Rs. 41-3-3 and the incidence 10·99 per cent. The field is cultivated on a yearly lease. The cultivator pays the Sávkár Rs. 25 and the Sávkár pays the assessment Rs. 17 and presumably also the Local Fund charge. Mr. D'Souza makes the following remarks on the subject of Sávkárs and mortgages :—"In the course of *rujuvát* in this táluka I have ascertained that an immense amount of land, chiefly owned by Doria Khátedárs—perhaps even more than in other tálukas—is in the hands of the Sávkár. The terms on which a Sávkár usually holds it is a mortgage, either with possession, *kabja giro*, or without possession, *san giro*. In not a few cases Sávkárs, especially Márwádi Vánias, have commenced to buy the land outright by *mobadlas** or to appropriate it by foreclosing the mortgages, and then cultivate it themselves or by their agents. These facts are interesting in a crop experiment report in so far as they throw light on the terms on which land can be sublet in the táluka. In cases in which land has come to be registered in the name of a Sávkár who is unwilling to cultivate it himself, he either sublets it on a yearly lease for rent varying from half as much again, as in the present experiment, to double the Government assessment; or he has it cultivated by a resident of the village who bears all the expenses of cultivation including seed, manure, &c., and in return goes halves with the Sávkár with regard to the produce, the Sávkár paying the whole of the assessment. In cases where the Sávkár is only a mortgagee, not Khátedár, the practice is different. In cases of *kabja giro* or mortgage with possession yearly rent-notes or deeds of lease are passed between Khátedár and Sávkár, and it is rarely that the Khátedár's possession is disturbed. The Sávkár knows that evicting him would be killing the goose that lays the golden egg. For both in *kabja giros* as in *san giros*, especially in long standing debts, the Sávkár, as a rule, insists that his debtor should, either for an indefinite period or during a number of instalments which he fixes at his discretion, yield to him the whole produce, he (the Sávkár) paying the assessment. The debtor meanwhile has to maintain himself and family on grain (*kháoti*) borrowed† from the same Sávkár on condition of returning half as much again next year."

It is not, as Mr. D'Souza observes, from such transactions between Sávkár and debtor that the difference between the economic rent and the Government assessment can be ascertained.

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*Getting the *khátá* or registered occupancy entered in their name.
†In other words, this is the ordinary type of rack-renting

Maximum rice rates for Sodhalváda, group III, are for soil Rs. 2-12 and for water Rs. 7.

*Experiment Nos. 136 and 137.*—The same crops at Palsána. The field measures 1 acre 10 gunthas and is assessed at Rs. 12-8, including Rs. 3-2 for tank water, or Rs. 10 per acre. The number appears to always grow a second crop of *vál*. Thirty-two gunthas of the field are separate and the test was taken in that portion. Seedlings were reared in a corner of this field. Seed-bed 5 gunthas or 6¼ gunthas per acre; seed rate 192 lbs. per acre which is very high. The seed-bed was manured with 12 loads of manure; on the 27 gunthas of field remaining 15 maunds castor cake were spread. The cake was crushed and applied by hand to the roots of the seedlings about 10 days after transplanting. The Khátedár has about 4 acres of rice land and cannot manure every year. Mr. D'Souza remarks that this is generally the case in Párdi where rice is the only staple. The crop was once flooded from the tank at the beginning of October. Mr. D'Souza calls the cultivation indifferent, but the word is hardly a fair one. The crop is said to be a 12-anna one. The acre outturn was 1,697 lbs. grain and 2,780 bundles straw worth Rs. 34-14-1.

The *vál* crop is estimated by Mr. Mehta at 9 annas. Sixty pounds seed were broadcasted. The outturn was 555 lbs. pulse, 415 lbs. *gotar* and 240 lbs. stalks per acre worth in all Rs. 12-12-7. The value of the double outturn is Rs. 47-10-8 and the incidence of assessment 20·97 per cent. Here as elsewhere Messrs. D'Souza and Mehta differ as to the description of soil, the former calling it black and the latter *besar*.

Maximum rates for Palsána for rice land are for soil Rs. 3 and for water Rs. 10.

*Experiment Nos. 138 and 139.*—The same at Párdi Kasba itself except that the variety of rice is different. *Dángi* is rather superior to *Kada*, selling at the rate of 47½ lbs. per rupee. It is only grown in fields where there are exceptional facilities for irrigation and on soils which are retentive of moisture. The field of experiment measures 9 gunthas and is assessed at Rs. 2, including Re. 0-4-6 for tank water, or Rs. 8-14-2 per acre. The field usually has a second crop. The assessment for tank water is low and Mr. D'Souza explains that the tank is not used for irrigation at all, but the rate he conjectures must have been imposed for soakage water. Only seven of the numerous rice fields surrounding the tank are assessed for tank water. The holding measures 39 gunthas and for this area 96 lbs. seed were sown on a seed-bed of 16 gunthas—average per acre about 96½ lbs. on 16½ gunthas of seed-bed. There appears to be two seed-beds which are used alternately year and year about. Twelve loads of cattle dung were applied to the bed this year and it was rábed. Owing to the break in the rains the seedlings were not transplanted till August. Seven loads of ordinary manure are said to have been applied to the 9 gunthas of permanent bed, 31½ loads per acre. It was not weeded, nor was the seed-bed. The outturn of grain, a 16-anna crop, was 2,309 lbs. per acre with 4,200 bundles of straw worth together Rs. 53-13-11.

The *vál* crop is estimated by Mr. Mehta as an 8-anna one. Sixty pounds seed were broadcasted and the outturn was 427 lbs. per acre of pulse with 427 lbs. *gotar* and 169 lbs. stalks valued at Rs. 10-8-6. The soil is the same as in previous experiments—*besar*, or according to Mr. D'Souza black. The total value of the double crop was Rs. 64-6-5, and the incidence of assessment 13·79 per cent.

Maximum rates for Párdi are Rs. 3 and Rs. 10 respectively for soil and water.

*Experiments Nos. 140 and 141.*—Experiment at Umarsádi, on *Kada* rice by Mr. Pránlál Harkisandás and *vál* by Mr. Mehta. The soil is *besar*. The number measures 1 acre 17 gunthas and is assessed at Rs. 13-8 including Rs. 4 for tank water, or Rs. 9-7-7 per acre. Mr. Pránlál says the season was "favourable on account of the surface water from the surrounding Jiráyat high lands having found its way into this *kiári*." This of course as a matter of fact has nothing whatever to do with the season, but must happen every year, and is due to the position of the field. The crop is estimated at 18 annas. The cultiva-

tion is said to be "very good indeed," but Mr. Pránlál gives us no description or reason for the praise except the vague statement that the owner, a porter, seems to have properly looked after the field. Eighty* carts of ordinary manure are said to have been applied to the whole area, 1 acre 17 gunthas, including the seed-bed which was in the number. From this I suppose the seed-bed was not rábed, but Mr. Pránlál does not say. The seed rate is given as 130 lbs. per acre and the area of seed-bed between 3 and 4 gunthas for the whole field, which is low —too low probably to be believed. Mr. Pránlál makes no remarks at all about the field or crop. The total outturn per acre is 3,346 lbs. grain and 2,784 lbs. straw. The experimenter again values the *Kada* rice at 45½ lbs. and fodder at 700 lbs. per rupee. For reasons given elsewhere I cannot accept this valuation and take it at 51½ lbs. At this rate the value of the whole comes to Rs. 68-15-2.

Mr. Mehta tested the second crop, *vál*. *Vál* appears to be always grown as a second crop on this field. No separate anna valuation is given. Seed rate was 60 lbs. broadcasted and outturn was 783 lbs. pulse plus 1,440 lbs. *gotar* and stalks, the whole valued at Rs. 19-3-0; pulse valued at 57½ lbs. per rupee. The 1,440 lbs. of byproduct are valued at Rs. 6-9 but the separate figures for *gotar* and stalks are not given. Supposing there were 900 lbs. *gotar*, this, valued at 150 lbs. per rupee, comes to Rs. 6, and, I think, we may fairly allow the stalks to be worth about 9 annas, so that the valuation for byproducts may stand.

The total value of the two crops comes Rs. 88-2-2 and the incidence to 10·75 per cent. which is very light.

*Experiment No. 142.*—I now take the one experiment by Mr. Mehta on castor. Of the total cultivated area of the táluka 13·2 per cent. is said to be under this crop. Mr. Mehta gives very meagre details and in fact makes no use of the remark column. The field measures 2 acres 36 gunthas and is assessed at Rs. 3-4 or Re. 1-1-11 per acre. The soil is said to be "poor and uneven and containing lots of lime." The crop is said to be a 12-anna one and the late rains about the Diváli were very favourable. No manure was applied. The field was cultivated from 1880-1885 and used for grazing after that. This year it was again broken up for cultivation. Forty pounds seed are said to have been drilled per acre. The outturn was 198 lbs. oil-seed per acre and the seed is priced at 24 lbs. per rupee. In my experiments in Bárdoli and Jalálpor I took about 21 lbs. per rupee. The total value comes to Rs. 8-4 per acre and the incidence of assessment to 13·57 per cent.

Umarsádi (group II) has a dry-crop maximum rate of Rs. 1-12.

The next three experiments are on *nágli* (*rági*, *náchni* or *bávto*, Elusine coracana) by Mr. D'Souza. A fair area is under this crop, 7·8 per cent. of the total cultivated area in the táluka. Mr. D'Souza makes the following general remarks about *nagli*:—

"*Nágli* forms with *kodra* the staple food of the Káliparaj population of Párdi and Balsár tálukas and is eaten in the shape of *rotlo* or unleavened bread; an adult male is estimated to consume 1½ *ser* of *nágli* a day with one *ser kodra* prepared as *pej* or porridge. When wages are paid in kind to labourers, 6† *sers* of *kodra*, 5 *sers* rice in husk or 3 *sers* of *nagli* is the usual rate per day.

"A *nágli* crop has the reputation of exhausting the soil; it is usually followed by at least one year's fallow; the only exception to this practice being in the case of areas with unusual facilities for copious manuring, e.g., lands in the possession of Bharváds or shepherds, or *adhars*, *i.e.*, rábed nursery beds for rice seedlings. In the latter case it is mixed with *tuver*, *kodra*, &c. The *nágli* crop selected in this and the two following experiments may be taken as representative of about 50 per cent. of the area under *nágli* in the respective villages and the results of fairly careful tillage. The other 50 per cent. is greatly inferior, usually raised from broadcasted seed by Káliparaj cultiva-

* This must be a great exaggeration.

† Mr. D'Souza is not very clear, but presumably he means 6 *sers kodra* plus 5 *sers* rice or 3 *sers nagli*.

tors with little or no preparatory tillage. This system of cultivation may b described as trusting to Providence and is hardly a fit subject for experiment."

It would, however, have been interesting to see what the outturn of such cultivation actually was. In all these experiments the assessments are low.

*Experiment No. 143.*—*Nágli* at Umarsádi. The field measures 4 acres 14 gunthas and is assessed at Rs. 3-2 or Re. 0-11-6 per acre. Part of the field, varying in different years from 14 to 34 gunthas, is under rice with a second crop; the rest under *kodra* or *nágli* or other such crops. The season is said to have been favourable and the cultivation good. Local anna estimate is 14.* The soil is *káli besar dádrivali* or stony ground. The seed rate is given as 2½ lbs. per acre, broadcasted on a rábed seed-bed and transplanted in August. *Nágli* was sown this year on 3 acres 30 gunthas and for this area the seed-bed measured 16 gunthas, and on it 9½ *sers* seed were put, 2½ lbs. and 4¼ gunthas per acre of transplantation. The seed-bed was weeded 8 days after sowing by 4 men. The field itself was not manured. It was ploughed four times and the seedlings were put into holes made with a pointed bit of *bámboo*. The field was once weeded. The crop is harvested by picking the pods; the straw being of little or no value is in many cases left uncut in the field and is eaten in the hot weather when fodder is scarce by buffaloes only or is used as ráb material. In these experiments the byproducts have not been valued. The outturn was 1,184 lbs. grain per acre valued, at 40½ lbs. to the rupee, at Rs. 29-3-9 and the incidence of assessment comes to 2·45 per cent.

*Experiment No. 144.*—The whole field measures 4 acres 12 gunthas and is assessed at Rs. 6-10 or Re. 1-8-8 per acre. About one acre of it belongs to a sub-sharer who has planted *nágli* in the whole of his share. Six pounds seed were sown on a seed-bed of 4 gunthas which had been rábed. Five loads of cattle manure weighted down with a layer of two cart-loads of rubbish, *kodra* stalks, &c., were burnt and then the bed was twice ploughed at the first rains. Seed was broadcasted and covered with a levelling board. The bed was not weeded. The field has not been manured since 1892-93 after a crop of sugarcane had been taken from it; it was ploughed 4 times and levelled with a board twice, this being necessitated by the amount of weeds in the field. Seedlings were transplanted in August. The crop was weeded twice, once in August and again in September.

Mr. D'Souza remarks that there were better crops in the village, but this one represents the average of the season in the village where most of the manure and labour goes to rice and sugarcane. He estimates this crop at 12 annas, but from these remarks and the statement that the season was good I imagine that 16 should be the proper entry.

The soil is called *besar*. The field appears to grow sugarcane once every 5 years. It also grows brinjals, broadcast rice, *vál*, *kodra*, *tuver* and *udid* (Phaseolus radiatus). The outturn was 827 lbs. grain per acre valued at Rs. 20-6-11 and the incidence of assessment comes to 7·54 per cent.

Maximum dry crop rate for Palsána is Re. 1-12.

*Experiment No. 145.*—The third and last experiment on this crop was at Sukhláv. The field measures 38 gunthas and is assessed at 15 annas or Re. 0-15-9 per acre. The soil is *besar* and the cultivation is described as good. This year, of the total area, 20 gunthas were under *nágli* and 18 were *padtar*† (under grass). Last year 32 gunthas grew *nágli*. For three years before that the whole field grew *nágli* and for 5 years before that 24 gunthas were under *nágli* and the rest under grass. Seed was sown at the rate of 5 lbs. in 5 gunthas of seed-bed per acre. The bed was rábed, apparently as much as 12½ loads of manure per acre (*i.e.*, for the 5 gunthas of seed-bed) being used. Seventy goats and sheep are said to have been folded in the field for 2 months. It was twice ploughed. Seedlings were transplanted in August. The field was weeded once in September. The crop is estimated at 16 annas. The total outturn per acre being 1,845 lbs. grain valued, at 40½ lbs. per rupee, at Rs. 45-8-10. The incidence of assessment comes to the low percentage of 2·16. Mr. D'Souza remarks that the crop was a good one, but not better than a good many neighbouring fields cultivated by Bharwáds of the village.

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*The anna estimate ought probably to be 16 annas.

†Mr. D'Souza says "fallow," but the original word in Village Form No. III is undoubtedly *padtar*, which means much more often "under grass" than fallow.

Sukhláv (group II) maximum dry-crop rate is Rs. 1-12.

The three experiments on *nágli* are shown together thus :—

| Field. | Outturn of grain per acre. | Gross value of produce | | | Assessment per acre. | | | Percentage incidence of assessment. |
|---|---|---|---|---|---|---|---|---|
| | Lbs. | Rs. | a. | p. | Rs. | a. | p. | |
| Survey No. 761 (Exp. No. 143) ... | 1,184 | 29 | 3 | 9 | 0 | 11 | 6 | 2·45 |
| Survey No. 61 (Exp. No. 144) ... | 827 | 20 | 6 | 11 | 1 | 8 | 8 | 7·54 |
| Survey No. 171 (Exp. No. 145) ... | 1,845 | 45 | 8 | 10 | 0 | 15 | 9 | 2·16 |

I now turn to Mr. D'Souza's four experiments on sugarcane.

*Experiment No. 146.*—An experiment on a mixture of Malbári and Kálibhur sugarcane at Kachwál. The survey number measures 7 acres 18 gunthas and is assessed at Rs. 14-12 or Re. 1-15-8 per acre. Included in the Rs. 14-12 is a sum of Rs. 6-12 Bágáyat *kasar* or well rate payable in respect of an old well which has since tumbled down, and was originally in another field. At present there is a new *pakka* well in the number from which the cane was watered. The soil is classed as Bágáyat and is a fine *goráda* loam; it is situated in a loop formed by the Par river and shows, Mr. D'Souza says, indications of alluvial accretions from that river. It cannot, that officer thinks, be classed as Bháta, because it is situated "higher than the highest flood level." The soil probably is ordinary Bháta, and I am rather surprised that it was not classed at the original survey as such.

Sugarcane has been tried on several portions of this number for the last ten years. The area under the cane now is about 4 acres. Before beginning to grow cane, about 400 cart-loads per acre of tank mould and fresh soil from a mango grove were carted on to the field.

The crop is a mixture in equal proportions. In June 1894 the land was ploughed and *san* was sown, 1½ maunds per acre. This was dug in when a couple of feet high and the land was several times ploughed and bullock-hoed by a *champan*, and the larger clods crushed by a *mogri* or hand-mallet. The cane was planted by plough (*nágar*). The cane passing through the drill is deeply embedded in the furrows about 8 inches down. The land is again ploughed. Over an acre‡ 1,500 *sántas* of cane were planted. A *sánta* is a unit of six *háths* of cane and may include two or even three canes. Mr. D'Souza says the price for Malbári *sántas* was Rs. 35 and for Kálibhuri Rs. 30 per thousand.

Nothing was done to the crop till the shoots had appeared well above the ground. It was then watered. Ten waterings were given up to June and three hand-hoeings and weedings. It may be noticed that in all Mr. D'Souza's experiments the number of operations said to have been performed is very great. It may perhaps be open to a little doubt whether really so many as ten waterings were given to the sugarcane. The crop is considered as a 16-anna one.

The outturn figures are as follows :—

| | Per 2 gunthas. | | | Per acre. | | |
|---|---|---|---|---|---|---|
| Number of canes ... ... | 1,125 | | | 22,500 | | |
| | Lbs. | | | Lbs. | | |
| Weight of canes ... ... | 4,132 | | | 82,640 | | |
| Weight of juice ... ... | 3,124 | | | 62,480 | | |
| Market weight of Gol... ... | 505 | | | 10,100 | | |
| Net weight of Gol ... ... | 473 | | | 9,460 | | |
| Weight of dry leaves ... ... | 377 | | | 7,540 | | |
| Weight of green tops ... ... | 144 | | | 2,880 | | |
| | Rs. | a. | p. | Rs. | a. | p. |
| Price of Gol at Re. 1-12 per maund. | 22 | 15 | 6 | 459 | 8 | 9 |
| Price of dry leaves at Re. 1 per 100 bundles. | 0 | 7 | 2 | 9 | 0 | 0 |
| Total value of yield ... | 23 | 6 | 8 | 468 | 8 | 9 |

* 1,850 is the ordinary rate.

| | |
|---|---|
| *Incidence of assessment ... | ... 0·42 per cent. or 0·84 per cent. for two years. |
| Percentage of juice to cane ... | ... 75·60. |
| ,, Gol to juice ... | ... 15·14. |
| ,, Gol to cane ... | ... 11·44. |
| Weight of 100 Malbári canes stripped | ... 426·3 lbs. |
| ,, ,, Kálibhuri ,, ,, | ... 308·3 ,, |

Percentage of yield for the two varieties is not given separately. It would have been interesting to compare them.

Mr. D'Souza gives a number of scattered figures and statements as to expenditure, but does not collect them so as to show the cost of cultivation. I have gathered them together as best as I can, and give them here.

| Item. | Amount. | | | Remarks. |
|---|---|---|---|---|
| | Rs. | a. | p. | |
| Government assessment ... ... | 1 | 15 | 8 | Only *san* seed used. |
| Manure ... ... ... | 1 | 0 | 0 | 750 Malbári canes at Rs 35 per thousand and 750 Kálibhuri canes at Rs. 30. |
| Seed... ... ... ... | 49 | 0 | 0 | |
| Share of cost of carting fresh soil ... | 4 | 0 | 0 | |
| 16 ploughings (16 pairs bullocks, 32 men). | 16 | 8 | 0 | A pair of bullocks at annas 12, 1 man at 2¼ annas, or 2 annas and 3 pies worth tobacco. |
| 4 bullock-hoeings (4 pairs bullocks, 8 men) | 4 | 2 | 0 | |
| Planting cane do. .... | 4 | 2 | 0 | |
| 10 waterings (53 pairs bullocks, 107 men) | 54 | 12 | 0 | Watering was done by 2 *kos* or bags; each *kos* requires 2 pairs bullocks per day and 4 men were employed, 2 at the *kos* and 2 in the field; about ¾ acre can be watered in a day. |
| 3 hand-hoeings and weedings (18 men) ... | 2 | 4 | 0 | |
| 8 loads thorns at 2 annas per fence ... | 1 | 0 | 0 | |
| Labour 8 carts at 4 annas and 16 men ... | 4 | 4 | 0 | |
| Watching 5 months at Re. 1 ... | 5 | 0 | 0 | |
| Wear and tear of well apparatus ... | 7 | 8 | 0 | Rope and *kos* cost Rs. 15 and last 2 seasons. |
| Interest on cost of well at 9 per cent. ... | 18 | 0 | 0 | Original cost Rs. 200. |
| Crushing, &c.; 14 men at 4 annas each; 8 pairs bullocks at 10 annas for 6 days. | 51 | 0 | 0 | Men are paid 4 annas a day for their work. One pair of bullocks at 8 annas plus 2 annas for grass plus what he will eat of green tops. |
| Hire of mill at Re. 1 per day for 6 days... | 6 | 0 | 0 | |
| Price of earthen pots at Rs. 5 per 100 including cartage. | 12 | 8 | 0 | |
| Oil for lubricating mill ... ... | 0 | 2 | 6 | |
| Extra fuel for boiling Gol at anna 1 per maund of Gol. | 16 | 0 | 0 | |
| Total cost of cultivating one acre ... | 259 | 2 | 2 | |

If we added a liberal manuring the cost of cultivation would come to approximately Rs. 300 per acre, but even thus there is a pretty large margin of profit.

*Experiment No. 147.*—The sugarcane is a mixture of Malbári and Kálibhuri cane in the ratio of 3 : 1. The field measures 1 acre 36 gunthas and is assessed at Rs. 2-12. Twenty-three gunthas of the field are *kiári* or rice land and 1 acre 13 gunthas Jiráyat. The former is assessed at Rs. 2 and the latter at annas 12, This year the cane has been grown on about one acre of the Jiráyat portion, so

* Mr. D'Souza takes 2 years' assessment and gives the incidence at 0·84 which is fairer.

that the average assessment of the land under experiment is annas 9 per acre. About 10 years ago cane was grown on the whole number. The land is irrigated from a private well dug since settlement. Mr. D'Souza remarks that no land in the village appears to have been classed as Bágáyat, probably because of the difficulties of irrigation. What these difficulties are is not stated. The present experiment is proof that they are not insuperable.

The Khátedár, a hard-working and intelligent Dhodia cultivates the land. Sub-letting for sugarcane is rare; average sub-letting rate in the village is stated to be Rs. 25 per acre. I gather that Mr. D'Souza means for one year's sugarcane cultivation. The soil is good *goráḍu* loam. It is very lightly assessed.

In June 1894 the field was twice ploughed, and 3 maunds of *san* seed were broadcasted. The *san* was dug in when of proper height. The field was prepared for cane by 10 ploughings and 2 log harrowings. Cane was planted with the plough in December, only 1,500 *sántas* per acre being sown. The seed was grown by the cultivator himself. No watering was given till February. Ten waterings and 2 hand-hoeings and weedings are said to have been given before the rains. A thorn fence was made with 8 cart-loads of thorns and the crop was watched by the cultivator himself.

Crushing was done by a three-roller wooden mill. Such a mill costs about Rs. 50 for wood and carpenter's labour and is very slow at work and constantly liable to accident, causing suspension of operations till the Sutár arrives to repair it. The juice expressed is said, however, to be purer and the *gol* finer, but Mr. D'Souza suspects that this is a mere fancy.

The outturn is called a 20-anna one. The Malbári canes are three times as numerous as the Kálibhuri. The following represents the outturn, &c.:—

| | Per 2 gunthas. | | | Per Acre. | | |
|---|---|---|---|---|---|---|
| Number of canes ... ... | 956 | | | 19,120 | | |
| | Lbs. | | | Lbs. | | |
| Weight of stripped canes ... | 4,063 | | | 81,260 | | |
| Weight of juice ... ... | 2,845 | | | 56,900 | | |
| Market weight of Gol ... ... | 544 | | | 10,880 | | |
| Net weight of Gol ... ... | 501 | | | 10,020 | | |
| Weight of dry leaves ... ... | 227 | | | 4,540 | | |
| Weight of green tops ... ... | 216 | | | 4,320 | | |
| | Rs. | a. | p. | Rs. | a. | p. |
| Price of Gol at Re. 1-12 per maund ... ... | 24 | 12 | 2 | 495 | 4 | 0 |
| Price of dry leaves at Re. 1 per hundred bundles... ... | 0 | 6 | 10 | 8 | 9 | 7 |
| Total price of produce ... | 25 | 3 | 0 | 503 | 13 | 7 |

| | | |
|---|---|---|
| *Incidence of assessment | 0 11 | per cent. |
| Percentage of juice to cane... ... | 70·02 | |
| Do. Gol to juice ... | 17·60 | |
| Do. Gol to cane ... ... | 12·33 | |

*Experiment No. 148.*—This and the next experiment were both taken at Palsána. The survey number of this experiment measures 1 acre 27 gunthas and is assessed at Rs. 22-8 or Rs. 13-6-11 per acre. The field is *kiári* or rice land, and there is a tank water rate of Rs. 8-6 on the whole number which is included in the assessment of Rs. 22-8.

The field grows sugarcane every four or five years and at other times rice followed by a second crop of *vál*. The soil is said to be black soil. The crop is estimated at 16 annas. It was rather uneven, and so two separate patches of one guntha each were cut. Of the whole number sugarcane occupies one acre. The crop was a mixture, in equal proportions, of Malbári and Kálibhuri. On the acre 20 loads of farm-yard manure were spread in the hot weather of 1894. After two ploughings rice was sown broadcast and harvested in October. Then about 15 ploughings and cross ploughings were given, and 3 log harrowings with the *champan*. Cane was planted by the plough in November and 1,500 *sántas* were used per acre. The field was then immediately† flooded. Two more

* Mr. D'Souza takes two years' assessment, which gives the incidence as 0·22 per cent.

† Mr. D'Souza does not say whence the water came, but presumably from a well.

ploughings were given and the field was weeded. The next watering was given at the end of January and seven more waterings were given till the rains, with 3 hand-hoeings and weedings. In September one *khandi* of castor cake, at Rs. 10 per *khandi*, a high rate, was applied to parts of the field, and this, Mr. D'Souza thinks, accounts for the unevenness of the crop. The field was fenced and watched by a servant, but jackals did a good deal of damage in parts. Crushing was done with an iron mill.

The outturn figures are given below :—

| | Per 2 gunthas. | Per acre. |
|---|---|---|
| Number of canes ... ... ... | 963 | 19,260 |
| | Lbs. | Lbs. |
| Weight of stripped canes ... ... | 4,073 | 81,460 |
| Weight of juice ... ... ... | 2,137 | 42,740 |
| Market weight of Gol ... ... | 448 | 8,960 |
| Net weight of Gol ... ... ... | 416 | 8,320 |
| Weight of dry leaves ... ... | 331 | 6,620 |
| Weight of green tops ... ... | 87 | 1,740 |

| | Rs. a. p. | Rs. a. p. |
|---|---|---|
| Price of Gol at Re. 1-14 per maund ... | 21 13 6 | 436 14 0 |
| Price of dry leaves at Re. 1 per 100 bundles. | 0 8 6 | 10 9 7 |
| Total price ... | 22 6 0 | 447 7 7 |

| | | |
|---|---|---|
| Incidence of assessment ... ... | 3·00 | per cent. |
| Percentage of juice to cane ... ... | 52·46 | ,, |
| ,, Gol to juice ... ... | 19·46 | ,, |
| ,, Gol to cane ... ... | 10·21 | ,, |

The percentage of juice to cane is very low, but of *gol* to juice is high.

*Experiment No. 149.*—In this experiment the mixture was Malbári and Khajuria in the proportion of 1:3. The experiment was made to ascertain how many canes are required as seed per acre and what is the area required to furnish any given area with seed. *Gol* was not made. Mr. D'Souza says: "The crop of one guntha was cut, stripped, but the heads allowed to remain, useless stumps and diseased canes were separated, and both they and the whole canes used for seed were counted. Then the seed canes were measured roughly by the village measurer by hand so as to ascertain the number of *sántas* used. A *sánta* is supposed to be 6 cubits (*háths*) or 9 feet length of cane, but in practice is a good deal more. The number of canes was 470 and these gave 138 *sántas*, about 3 canes thus making a *sánta*. The canes were then carted to the field, *i.e.*, the field to be planted, Survey No. 311, where a fixed area of 5 gunthas was measured and were planted by *nágar* in the ordinary way.

"The *nágar* as is well known is a large plough with a drill or tube attached to it; the tube is so placed that as the *nágar* is worked the canes are left imbedded at a depth of about 9 inches in the furrows. Whole canes are placed in the tube, and as the top portions are unlikely to germinate, the supply is so regulated that about a cubit of the next cane is made to cover the top end of the previous one. Six pairs of bullocks and buffaloes worked the *nágar*, and 12 men were employed, seven to drive, one to place the canes, and four to carry them.

"The area planted was then measured and found to be 3½ gunthas. This is a small area to transplant out of one guntha, but the crop was a thin one, estimated at 12 annas, and the individual canes were small as the Khajuria variety preponderated. But from the experiment it appears that 138 *sántas* are required to plant 3½ gunthas or say 1,580* per acre, which corresponds as

* Mr. D'Souza writes 1,700; but this appears to be a slip. It, however, rather vitiates his argument, for 1,580 does not correspond particularly closely to 1,860 which is the acre rate of 62 per *vása* (3 *vásas*=4 gunthas) or (taking the Bigha equal to 27 gunthas) of 1,250 per Bigha. It, however, is near the rate of 1,500 *sántas* which Mr. D'Souza has taken in some of his experiments.

closely as can be expected with the 62 *sántas* per *vása* of Balsár táluka and 1,250 *sántas* per Bigha of Chikhli."

The price per 1,000 *sántas* is Rs. 35; dry leaves and stumps have been roughly valued. The total value of the acre yield only comes to Rs. 208-3-2. Mr. D'Souza supposes that it would have yielded Rs. 308-3-2 had it been manufactured into *gol*. He adds Rs. 100 for the cost of harvesting, manufacturing and replacing wear and tear of machinery and interest on capital which is quite a large enough allowance. The crop was a poor one and Mr. D'Souza says he took a test on it as it was the only one about to be planted during his stay in the village. Had he only weighed the canes, besides counting them, we should have been able to calculate, from the average percentages furnished by other experiments, very approximately the probable yield of *Gol*.

Twelve gunthas of the field including the portion that was cut had been prepared as the seed-bed for *Kada* rice and manured with 15 cart-loads of farm-yard manure and rábed. Seedlings were transplanted into the seed-bed also and the *Kada* was harvested in October. Then the field was prepared for sugarcane by 16 ploughings and 3 harrowings with the *champan*. Cane was then planted in November. No watering was given till February and in all 6 waterings and 4 hand-hoeings and weedings were given till the rains. A top dressing of one *khandi* of castor cake at Rs. 9 per *khandi* was given to this 12 gunthas. A fence of thorns was made and the crop watched for Rs. 4.

I tabulate together the results of the three experiments in this táluka on the mixture of Malbári and Kálibhuri canes :—

| Field. | Net weight Gol. | Value of produce per acre. | Assessment per acre. | Percentage incidence of assessment. | Percentage juice to cane. | Percentage of Gol to juice. | Percentage of Gol to cane. |
|---|---|---|---|---|---|---|---|
| | Lbs. | Rs. a. p. | Rs. a. p. | | | | |
| Survey No. 214 (Exp. No. 146). | 9,460 | 468 8 9 | 1 15 8 | 0·42 | 75·60 | 15·14 | 11·44 |
| Survey No. 341 (Exp. No. 147). | 10,020 | 503 13 7 | 0 9 0 | 0·11 | 70·02 | 17·60 | 12·33 |
| Survey No. 60 (Exp. No. 148). | 8,320 | 447 7 7 | 13 6 11 | 3·00 | 52·46 | 19·46 | 10·21 |
| Average ... ... | 9,267 | 473 4 8 | *... | *... | 66·07 | 17·27 | 11·33 |

* Fair average cannot be got, as one field is highly assessed Bágáyat and two are lightly assessed Jiráyat lands.

There were 6 experiments recorded before this year which I have added to the tabular statement.

C. N. SEDDON,
Assistant Collector, on Special Duty.

## APPENDIX A.

The following table gives certain information about 7 chief crops in the Surat District. The figures have been calculated from all the experiments, conducted this year and before, in the district:—

| Crop. | Seed rate per acre. | Outturn of principal product per acre. | Price of principal product per rupee. | Value of total yield per acre. | Present assessment per acre. | Percentage incidence of assessment. |
|---|---|---|---|---|---|---|
| | Lbs. | Lbs. | Lbs. | Rs. a. p. | Rs. a. p. | |
| Juvár... ... ... ... | $8\frac{2}{3}$ | 825 | $42\frac{3}{5}$ | 24 11 5 | 4 7 0 | 17·95 |
| Cotton ... ... ... | 15 | $361\frac{1}{2}$ | $11\frac{7}{13}$ | 31 5 3 | 5 4 4 | 16·82 |
| Inferior rice (Kada, &c.) ... | 128 | 2,014 | $49\frac{1}{4}$ | 45 1 3 | 10 11 7 | 23·78 |
| Superior rice (Kolamb, Bangáliu, Jhinu Sáliu, &c.). | 94 | 2,113 | $38\frac{6}{7}$ | 60 5 11 | 13 12 4 | 22·81 |
| Vál (as second crop) ... | $66\frac{7}{8}$ | 658 | $55\frac{1}{2}$ | 18 1 10 | 11 2 5 | 61·55 |
| Sugarcane (for Gol)... .. | 1,885 canes or 17,800 sets. | 7,920 Gol. | $19\frac{1}{5}$ | 432 2 7 | 11 10 7 | 2·69 |
| Sugarcane (for eating) .. | 9,193 sets. | 35,318 canes. | 147 canes about. | 240 2 4 | 15 10 4 | 6·51 |

The incidences for rice and *vál* are for the single crop. The average incidence of assessment on the average double crop of rice and *vál* is 16·51 per cent.

The total value for *juvár* includes the value of the subsidiary pulses, considerable in Chikhli, small elsewhere this year. The reason why *juvár* lands appear to be assessed more lightly than cotton lands is that *juvár* is grown in Chikhli while cotton is not.

## APPENDIX B.

The following statement gives the average for the *gol* making sugarcane of the district:—

| | Lbs. |
|---|---|
| Weight of stripped canes per acre ... ... | 72,618 |
| Do. juice do. ... ... | 47,627 |
| Do. Gol do. ... ... | 7,920 |
| | Rs. a. p. |
| Value of crop per acre (at rates ruling when the several experiments were made) ... | 432 2 7 |
| Percentage of juice to cane ... ... ... | 65·58 |
| Do. Gol to juice ... ... ... | 16·62 |
| Do. Gol to cane ... ... ... | 10·90 |

There are in all 9 chief varieties of cane grown in the district:—*Surti Meva, Malbári, Vánsi, Ráti* or *Káli, Kálibhuri, Khajuria, Phojbhuri, Máni, Lákadia* or *Kásda*. By far the commonest cane for *gol* production is *Malbári*.

## APPENDIX C.

The following information with regard to the weights and measures current among agriculturists in the Surat district may be useful.

The unit of weight is the *ser* composed of 37½ *tolas*.

| | | |
|---|---|---|
| 37½ *tolas* | ... | ... = 1 *ser*. |
| 40 *sers*... | ... | ... = 1 *man* or maund=38½ lbs. about. |
| 20 *mans* | ... | ... = 1 *khandi*. |
| 7 *mans* | ... | ... = 1 *háro* (in Jalálpor). |
| 21 *mans* | ... | ... = 1 *háro* (in Balsár). |
| 30 *mans* | ... | ... = 1 (*juvár*) *gáli*. |
| 31½ *mans* | ... | ... = 1 (rice) *gáli*. |
| 24 *mans* | ... | ... = 1 (cotton) *bhár*. |

Vegetables, oil, &c., are sold by the *khandi*. Rice, *kodra* and castor seed in the north by the *háro* of 7 maunds, and in the south by the *gáli* of 31½ maunds. *Juvár*, *bájri*, wheat, *tuver*, *mag*, *math*, *val*, *vatána*, gram, *láng*, by the *gáli* of 30 maunds; cotton by the *bhár* of 24 maunds; farm-yard manure by the cart-load; dried fish manure by the basketful; sugarcane seed by the thousand *súntas* or *sherdis* of 6 *háths* each. Each *háth* measures approximately 18 inches.

The unit for land measurement is the *vása* composed of 20 *visnavis*. 20 *vásas* make 1 *vingha* (or *bigha*) and the *vingha* varies from 23 to 27 gunthas. In converting Surati areas into British, 3 *vásas* are considered roughly equal to 4 gunthas.

# TABULAR SUMMARY.

*Summary of Crop Experiment Reports*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Yield of Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 1 | Bárdoli (Goji) ... | 36 | 1 11 | 3 12 0 | Sorghum vulgare (Juvár) mixed with Cajanus indicus (Tuver), 13th December 1895, and Dolichos lablab (Vál), 9th March 1896. | 16 | 1,200 | 15 | 870 | 260 bundles Kadbi. |
| | | Pot No. 1 | 0 33 | 2 8 0 | | | | 1 | 4 | 90 Juvár heads. |
| | | | | | | | | 3½ | 113 | 192 Vál stalks (Gotar). |
| 2 | Do. (do.) ... | 71 | 9 13 | 19 8 0 | Sorghum vulgare (Juvár) mixed with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 14th December 1895. | 8 | 600 | 16 | 291 | 190 bundles Kadbi. |
| | | | | | | | | 5 | 128 | 45 Juvár heads. |
| | | | | | | | | 3⅓ | 35 | 20 light Juvár grain. |
| | | | | | | | | | | 60 Tuver husks. |
| | Do. (Aphwa) .. | 70 | 9 19 | 35 0 0 | Sorghum vulgare (Juvár) mixed with Cajanus indicus (Tuver) and Phaseolus mungo (Mag). 17th December 1895. | 12 | 900 | 8 | 874 | 320 bundles Kadbi. |
| | | Pot No. 2 | 1 12 | 5 0 0 | | | | 3½ | 144 | 90 Juvár heads. |
| | | | | | | | | 1⅔ | 26 | 90 chaff. |
| | | | | | | | | | | 17½ light Juvár grain. |
| | | | | | | | | | | 101 Tuver husks. |

are of the Original Survey.

| Acre. | | | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | | | Assessment, excluding Local Funds. | | Incidence of Assessment on the Value of Gross Produce. | | | Principal Product. | By-Product. | |
| 12 | | | 13 | | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. | a. | p. | Rs. | a. p. | Per cent. | A g. | Tolas. | Lbs. | Cwts. | |
| 23 | 9 | 1 | 3 | 0 6 | 12·89 | 0 8 | 37½ | 48 juvár; 38½ tuver; 57⅔ vál. | 200 bundles kadbi; 3⅔ juvár heads; 13/14 gotar. | *Experiment No. 1.*—A good field near the village-site. |
| 11 | 14 | 1 | 2 | 1 6 | 17·62 | 0 8 | Do. | 48 juvár; 38½ tuver; 44⅔ mag. | 267 bundles kadbi; 2⅔ juvár heads; 1 1/7 light juvár grain. 1 tuver husks. | *Experiment No. 2.*—A poor field far from the village site. |
| 25 | 2 | 6 | 3 | 13 6 | 15·28 | 0 8 | Do. | 48 juvár; 38½ tuver; 44⅔ mag. | 256 bundles kadbi; 2⅔ chaff and heads; ½ light juvár grain; 1 13/14 tuver husks | *Experiment No. 3.*—Anna estimate probably too low. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Taluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs |
| | *Mr. C. N. Seddon, Assistant Collector*—continued. | | | | | | | | | |
| 4 | Bardoli (Aphwa) ... | 152<br>Pot No.<br>1 | 5 26<br>3 16 | 21 0 0<br>12 4 0 | Cotton (Three pickings). 8th February to 9th March 1896. | 16 | 450 | 21 | 365 Seed cotton. | ..... |
| 5 | Do. (Goji) ... ... | 69 | 5 34 | 14 8 0 | Do. (Four pickings). 25th January to 9th March 1896. | 16 | 450 | Unknown | 312 Seed cotton. | ..... |
| 6 | Do. (Sarbhán) ... | 349<br>Pot No.<br>1 | 6 6<br>2 32 | 30 0 0<br>14 4 0 | Do. (Four pickings). 27th January to 11th March 1896. | 16 | 450 | 16 to 17 | 296 Seed cotton. | ..... |
| 7 | Do. (do.) ... | 358 | 7 11 | 24 8 0 | Do. (Four pickings). 27th January to 11th March 1896. | 14 | 390 | 16 to 17 | 187 Seed cotton. | ..... |
| 8 | Do. (do.) ... | 223<br>Rice. | 4 12<br>3 33 | 57 8 0<br>55 6 0<br>(13 2 4 water rate). | Rice (Kada), 17th October 1895. | 8 | 1,160 | 90 | 1,470 in husk. | 1,580 bundles. |
| 9 | Do. (do.) ... | 299<br>Pot No.<br>1 | 2 19<br>2 14 | 46 0 0<br>(18 9 0 water rate).<br>43 8 0 | Rice (Kolamb), 16th November 1895; followed by | 8 | 1,160 | 115 | 2,477 in husk. | 2,850 bundles. |
| 10 | Do. (do.) ... | Do. ... | Do.... | Do. ... | Dolichos lablab (Vál) and Castor seed, 20th March 1896. | 12 | 560 | 85<br>4 | 599<br>16 Seed. | 865 |
| 11 | Do. (do.) ... | 302 | 1 15 | 23 8 0<br>(8 9 6 water rate). | Rice (Kolamb), 16th November 1895; followed by | 8 | 1,160 | Unknown. | 1,381 in husk. | 2,750 bundles. |
| 12 | Do. (do.) ... | Do. ... | Do. | Do. ... | Dolichos lablab (Vál), 26th March 1896. | 16 | 750 | Unknown. | 482 | 692 |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | | A. g. | Tolas. | Lbs. | Cwts. | |
| 31 10 8 | 3 9 8 | 11·38 | | 0 8 | 37½ | 11 $\frac{7}{13}$ | ... | *Experiment Nos. 4—7.*—These cotton crops may safely be taken as average crops for the fields. Here and everywhere in the report the figures in column 10 are for *seed cotton*, not for clean cotton. |
| 27 1 4 | 2 7 9 | 9·17 | | 0 8 | Do. | 11 $\frac{7}{13}$ | ... | |
| 25 10 0 | 5 1 5 | 19·85 | | 0 8 | Do. | 11 $\frac{7}{13}$ | ... | |
| 16 4 0 | 3 5 11 | 20·73 | | 0 8 | Do. | 11 $\frac{7}{13}$ | ... | |
| 32 9 10 | 14 7 8 | 44·39 | | 0 10 | Do. | 51¼ | 400 bundles. | *Experiment No. 8.*—This year there was no second crop as the rice was followed by sugarcane. Incidence is therefore on the single crop. But the field always grows a second crop of *vál* and castor, or else it grows sugarcane. |
| 71 8 3 | 18 8 2 | 25·88 | | 0 4 | Do. | 38½ | 400 bundles. | *Experiment Nos. 9 and 10.*—Anna estimate probably too low for rice. Incidence on double crop 20·53 per cent. |
| 18 10 3 | Do. | 99·30 | | 0 4 | Do. | 57⅔ vál. 21 $\frac{1}{9}$ castor seed. | 1 | |
| 42 12 6 | 17 1 5 | 39·94 | | 0 4 | Do. | 38½ | 400 bundles. | *Experiments Nos. 11 and 12.*—Incidence on the two crops 29·91 per cent. |
| 14 5 7 | Do. | 119·09 | | 0 4 | Do. | 57⅔ | 1 | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. C. N. Seddon, Assistant Collector*—continued. | | | | | | | | | |
| 13 | Bárdoli (Sarbán) ... | 300<br>Pot No. 5 | 1 15<br>0 19 | 23 8 0 (8 9 6 water rate).<br>8 0 0 | Rice (Bangáliu), 16th November 1895; followed by | 10 | 1,450 | Unknown. | 2,457 in husk. | 3,750 bundles. |
| 14 | Do. (do.) ... | Do. ... | Do. | Do. ... | Dolichos lablab (Vál), 26th March 1896. | 16 | 750 | 160 | 274 | 480 |
| 15 | Do. (do.) ... | 226<br>Pot No. 3 | 2 5<br>1 19 | 38 8 0 (15 4 4 water rate).<br>26 12 0 | Rice (Kolamb), 16th November 1895; followed by | 12 | 1,750 | 95 | 2,517 in husk. | 2,304 bundles. |
| 16 | Do. (do.) ... | Do. ... | Do. | Do. ... | Wheat (Potá), 9th March 1896. | 10 | 610 | 80 | 927 | 192 |
| 17 | Do. (Bárdoli) ... | 106 | 1 16 | 17 8 0 | Rice (Sáliu), 16th October 1895; followed by | 8 | 1,160 | 85 | 786 in husk. | 1,090 bundles. |
| 18 | Do. (do.) ... | Do. ... | Do. | Do. ... | Dolichos lablab (Vál), 8th March 1896. | 5 | 225 | 73 | 430 | 433 |
| 19 | Do. (Aphwa) ... | 7<br>Pot No. 2 | 1 23<br>0 37 | 19 8 0<br>11 8 0 (2 5 0 water-rate). | Rice (Jhinu Sália), 29th October 1895; followed by | 16 | 2,325 | 73 | 1,119 in husk. | 1,350 bundles. |
| 20 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál) and Castor seed, 25th March 1896. | 16 | 750 | 45<br>20 | 466<br>106 Seed. | 720 |
| 21 | Do. (Puni) ... | 132 | 3 35 | 67 0 0 | Rice (Kada), 17th October 1895. | 8 | 1,160 | 96 | 762 in husk. | 1,855 bundles. |
| 22 | Do. (Aphwa) ... | 266 | 0 24 | 5 8 0 | Rice (Kada), 18th October 1895. | 12 | 1,750 | 96 | 1,460 Do. | 1,500 Do. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Prices of Produce per Rupee. | | |
|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser. | Principal Product. | By-Product. | Remarks. |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 73 4 3 | 16 13 6 | 22·99 | 0 4 | 37½ | 38½ | 400 bundles. | *Experiment Nos. 13 and 14.*—Anna estimate probably rather low for rice but correct for *vál*. Incidence on the double crop 20·49 per cent. |
| 8 14 8 | Do. | 188·90 | 0 4 | Do. | 57⅔ | 1 | |
| 71 3 5 | 18 2 2 | 25·46 | 0 20 | Do. | 38½ | 400 bundles. | *Experiment Nos. 15 and 16.*—Anna estimate probably slightly low for rice and possibly slightly low for wheat, but fine wheat crops are got from these rice fields. Incidence on the double crop 15·86 per cent. |
| 43 2 0 | Do. | 42·05 | 0 8 | Do. | 22 | 1⅞ | |
| 22 4 6 | 12 8 0 | 56·10 | 0 4 | Do. | 41 | 350 bundles. | *Experiment Nos. 17 and 18.*—Incidence of assessment on the two crops comes to 37·33 per cent. |
| 11 3 2 | Do. | 111·62 | 0 4 | Do. | 57⅔ | 1 | |
| 31 0 6 | 12 6 11 | 40 06 | 0 8 | Do. | 41 | 360 bundles | *Experiment Nos. 19 and 20.*—Rs. 2-5-0 of the assessment of the Pot number is for a well which is not used for rice, or indeed for any crop in this field. Percentage incidence on the two crops comes to 24 66. |
| 19 5 11 | Do. | 64·18 | 0 8 | Do. | 57⅔ *vál* 21½ castor seed. | 1 | |
| 19 8 1 | 17 4 8 | 88·65 | 0 8 | Do. | 51¼ | 400 bundles. | *Experiment No. 21.*—The field always has a second crop. None this year owing to family difficulties. Incidence therefore on the first crop alone. |
| 32 13 6 | 9 2 8 | 27·91 | 0 4 | Do. | 51¼ | 343 bundles. | *Experiment No. 22.*—The field, usually but not always, grows a second crop of *vál*. None this year. Incidence therefore on the first crop alone. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per — Yield of — Seed. | Principal Product. | By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. M. B. Tyabji, Assistant Collector.* | | | | | | | | | |
| | *Bárdoli (Barbla)* ... | *95* | *2 19* | *38 8 0 (10 0 0 water-rate).* | *Dolichos lablab (Val), 5th March 1889.* | *16* | *750* | *61* | *1,081* | *1,008 cavees 210 stalks.* |
| | *Mr. A. G. Kotwal District Deputy Collector.* | | | | | | | | | |
| | *Do. (Pera)* .. | *155* | *1 37* | *15 0 0* | *Castor seed, 2nd March 1892.* | *12* | *340* | *45* | *458 Seed.* | ..... |
| | *Do. (Tarbhán)* .. | *175* | *7 35* | *25 12 0* | *Castor seed, 16th March 1892.* | *12* | *340* | *33* | *488 Do.* | ..... |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 23 | Do (Bárdoli) ... | 257 | 3 16 | 27 0 0 | Potatoes, 23rd February 1896. | 14 | 7,220 | 600 | 3,456 | ..... |
| 24 | Do. ( do. ) ... | 269 | 1 33 | 15 8 0 | Do. | 14 | 7,220 | 600 | 3 221 | ..... |
| 25 | Do. ( do ) .. | 190 | 4 8 | 33 0 0 | Convolvulus batata Sakaria, Sweet Potatoes). 24th February 1896. | 8 | 3,875 | ... | 4 904 | ..... |
| 26 | Do ( do. ) ... | 204 | 5 6 | 17 8 0 | Do. .. | 8 | 3,375 | ... | 4,231 | ..... |
| 27 | Do. ( do. ) .. | 195 | 6 3 | 59 0 0 | Ginger (Adu), Turmeric (Haldar). Yams (Ratálu) and Chillies (Marchi), 6th January 1896. | 12 | 2,810<br>1,690 | 1 400<br>1.120<br>840 | 3,377<br>2,564<br>1,880<br>102 | ..... |
| 28 | Do. ( do ) .. | 194 | 5 27 | 55 0 0 | Ginger (Adu). Turmeric (Haldar), 7th January 1896. | 14 | 3 275<br>2,975 | 1.700<br>340 | 8 337<br>2,564 | ..... |
| 29 | Do ( do ) ... | 239<br>Pot No.<br>1 | 5 28<br>3 10 | 51 0 0<br>29 2 0 | Sugarcane (dark or red), 6th January 1896. | 16 | ... | 11,000 sets. | 28,800 canes (number). | ..... |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. Umedrám Ranchoddás, District Deputy Collector.* | | | | | | | | | |
| | *Bárdoli (Runira)* ... | *125* | *7 17* | *29 0 0* | *Wheat (Hénsia), 16th February 1891.* | *12* | *730* | *66* | *1.129* | *1,133* |
| | *Do. (Bharampor)* . | *24* | *8 34* | *33 8 0* | *Do. do.* ... | *8* | *490* | *66* | *669* | *645* |
| | *Mr. A. G. Kotwál, District Deputy Collector.* | | | | | | | | | |
| | *Do. (Ráyam)* ... | *13* | *5 27* | *23 12 0* | *Do. 20th February 1893.* | *8* | *490* | *76* | *624* | *4* |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 30 | Jalálpor (Vijalpor) ... | 32<br>Pot No. 3 | 6 15<br>2 11 | 40 0 0<br>14 4 0 | Sorghum vulgare (Chapti Juvár) mixed with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 21st December 1895 | 14 | 1,050 | $9\frac{1}{2}$<br>$1\frac{1}{2}$<br>$\frac{1}{2}$ | 793<br>72<br>$2\frac{1}{5}$ | 375 bundles Kadbi; 26 light Juvár grain; 218 Juvár heads. |
| 31 | Do. (Eru) ... | 32 | 5 26 | 24 8 0 | Sorghum vulgare (Pirio Juvár) mixed with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 21st December 1895. | 16 | 1,200 | $8\frac{1}{3}$<br>$1\frac{2}{3}$<br>$1\frac{2}{3}$ | 865<br>43<br>29 | 275 bundles Kadbi; 16 light Juvár grain; 180 Juvár heads; 32 Tuver chaff. |
| 32 | Do. (Hansápor)... | 200 | 4 39 | 16 8 0 | Sorghum vulgare (Chapti Juvár) with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 22nd December 1895. | 12 | 900 | 14<br>2<br>2 | 453<br>10<br>24 | 190 bundles Kadbi; 16 light Juvár grain; 100 Juvár heads. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser. | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | | Lbs. | Cwts. | |
| *45 3 9* | *3 14 6* | *8·63* | *0 8* | *37* | | *30* | *$1\frac{11}{16}$* | *Dry-crop wheat land lately broken up for cultivation. For detailed remarks, vide Experiment No. 26 of Report for 1890-91.* |
| *25 11 3* | *3 12 7* | *14·73* | *0 8* | *Do.* | | *30* | *$1\frac{11}{16}$* | *Dry-crop wheat land long tilled and unmanured. For detailed remarks, vide Experiment No. 27 of Report for 1890-91.* |
| *25 6 8* | *4 3 0* | *16·47* | *0 8* | *Do.* | | *$24\frac{2}{3}$* | *5* | *Dry crop wheat on black soil. Yield much below tálluka average. For detailed remarks, vide Experiment No. 48 of Report for 1892-93.* |
| 24 14 8 | 6 4 3 | 25·14 | 0 8 | $37\frac{1}{2}$ | | 42 juvár, $38\frac{1}{2}$ tuver. $38\frac{1}{2}$ mag. | 107 bundles kadbi. | |
| 25 2 1 | 4 5 5 | 17 26 | 0 8 | Do. | | $42\frac{3}{4}$ juvár $38\frac{1}{2}$ tuver, $38\frac{1}{2}$ mag. | 107 bundles kadbi. | |
| 13 11 4 | 3 5 1 | 24 20 | 0 8 | Do. | | 42 juvár, $38\frac{1}{2}$ tuver, $38\frac{1}{2}$ mag. | 107 bundles kadbi. | *Experiment No. 32.*—An inferior soil field cultivated by a Koli. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. C. N. Seddon, Assistant Collector* —continued. | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs | Lbs. | Lbs. |
| 33 | Jalálpor (Jalálpor) .. | 344 | 6 23 | 23 0 0 | Sorghum vulgare (Pirio Juvár) with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 23rd December 1895. | 14 | 1,050 | 14 | 846 | 240 bundles Kadbi; 11 light Juvár grain; 166 Juvár heads. |
| | | Pot No. 1 | 3 12 | 11 8 0 | | | | 1⅔ | 9 | |
| | | | | | | | | ⅚ | 7⅛ | |
| | *Mr. A. L. M. Wood, Assistant Collector.* | | | | | | | | | |
| 34 | Do. (Vijalpor) .. | 33 | 4 19 | 28 0 0 | Sorghum vulgare (Juvár), 16th December 1895. | 16 | 1,200 | 11½ | 975 | 350 bundles Kadbi; 156 chaff. |
| 35 | Do. (Bodáli) .. | 43 | 10 3 | 53 0 0 | Do. 17th December 1895. | 16 | 1,200 | 11½ | 1,327 | 345 bundles Kadbi; 231 chaff. |
| 36 | Do. (Sisodra) .. | 332 | 5 33 | 18 8 0 | Do. with Cajanus indicus (Tuver) and Phaseolus mungo (Mag). 4th January 1896. | 16 | 1,200 | 13½ | 499 | 230 bundles Kadbi; 88 chaff. |
| | | | | | | | | 2 | 43 | 40 bundles Tuver stalks; 65 chaff; 23 Mag chaff. |
| | | | | | | | | 1 | 7 | |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 37 | Do. (Vijálpor) .. | 75 | 7 10 | 42 8 0 | Cotton (Four pickings). 30th January to 12th March 1896. | 16 | 450 | 13½ | 317 seed cotton. | ..... |
| | | Pot No. 1 | 1 30 | 10 4 0 | | | | | | |
| 38 | Do. (Eru) ... | 659 | 3 27 | 14 8 0 | Do. (Four pickings). 3rd February to 13th March 1896 | 16 | 450 | 8 | 430 seed cotton. | ..... |
| | | Pot No. 1 | 2 8 | 8 10 0 | | | | | | |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds | Incidence of Assessment on the Value of Gross Produce. | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 22 12 9 | 3 7 9 | 15·23 | 0 8 | 37½ | 42¾ juvár, 38½ tuver, 38½ mag. | 107 bundles kadbi. | |
| 23 15 6 | 6 4 1 | 26·09 | 0 8 | Do. | 46 | 133 bundles kadbi. | *Experiment No. 34.*—Subordinate crops, *tuver* and *mag*, not tested. Prices of grain taken by Mr. Wood rather low. |
| 31 10 9 | 5 4 2 | 16·60 | 0 8 | Do. | 46 | 133 bundles kadbi. | *Experiment No. 35.*—Subordinate crops, *tuver* and *mag*, not tested. |
| 15 0 3 | 3 2 10 | 19·83 | 0 8 | Do. | 46 juvár, 33 tuver, 33 mag. | 133 bundles kadbi; 4 4/7 chaff; 200 bundles tuver stalks; 1 2/7 tuver husks; 1 mag husk. | |
| 27 8 0 | 5 13 9 | 21·30 | 0 8 | Do. | 11 7/13 | ... | *Experiment No. 37.*—Formulæ yield (450 lbs.) too high. |
| 37 4 8 | 3 14 9 | 10·49 | 0 8 | Do. | 11 7/13 | ... | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Taluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. C. N. Seddon, Assistant Collector* —continued. | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| 39 | Jalálpor (Jalálpor) ... | 498 | 3 14 | 22 6 0 (4 6 0 water-rate). | Cotton (Three pickings), 29th January to 27th February 1896. | 16 | 450 | 12 | 341 seed cotton. | ..... |
| 40 | Do. ( do. ) ... | 499 | 5 8 | 25 0 0 | Do. ... | 16 | 450 | 12 | 481 seed cotton. | ..... |
| 41 | Do. ( do. ) ... | 47<br>Bágáyat | 1 5<br>0 37 | 19 8 0<br>18 4 0 | Rice (Jádu Sálin), 27th October 1895; followed by | 12 | 1,690 | 104 | 3,349 in husk. | 3,296 bundles. |
| 42 | Do. ( do. ) ... | Do. ... | Do. | Do. .. | Dolichos lablab (Vál) and Castor-seed, 13th March 1896. | 16 | 677 | 54<br>5½ | 1,685<br>27 seed. | 1,154<br>..... |
| 43 | Do. (Hansápor) . | 31<br>Pot No. 3 | 2 24<br>0 25 | 30 0 0<br>7 4 0 (1 15 3 water-rate). | Rice (Kada), 27th October 1895; followed by | 16 | 2,250 | 154 | 1,703 in husk. | 2,280 bundles. |
| 44 | Do. ( do. )... | Do. .. | Do. | Do. ... | Dolichos lablab (Vál) and Castor-seed, 12th March 1896. | 12 | 510 | 57<br>8 | 335<br>21 seed. | 385 |
| 45 | Do. (Vijalpor) .. | 115<br>Pot No. 4 | 2 26<br>0 37 | 49 7 0<br>16 8 0 (5 5 1 water-rate). | Rice (Kada), 23rd October 1895. | 14 | 1,970 | 240 | 1,578 in husk. | 2,520 bundles. |
| | *Mr. H. D. E. Forbes, Assist. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 46 | Do. (Saribujrug) . | 307<br>Rice. | 1 14<br>1 2 | 21 0 0<br>19 8 0 (7 8 9 water rate). | Rice (Kolamb). 11th November 1895. | 16 | 2,250 | 108 | 2,548 in husk. | 6,700 |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 47 | Do. (Jalálpor) ... | 525 | 2 38 | 24 8 0 | Sugarcane (Vánsi), 28th January 1896. | 16 | 5,250 | 14,000 sets. | 5,538 Gol. | 8,000 tops. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser. | | Principal Product. | By-Product. | |
| 12 | | 14 | 15 | 16 | | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | | Lbs. | Cwts. | |
| 29 9 4 | 6 10·10 | 22·57 | 0 8 | $37\frac{1}{8}$ | | $11\frac{7}{13}$ | ... | |
| 41 10 8 | 4 12 11 | 11·54 | 0 8 | Do. | | Do. | ... | *Experiment No. 40.*—Land lately broken up for cultivation. |
| 84 6 9 | 19 11 8 | 23·37 | 0 5 | Do. | | 44 | 400 bundles. | *Experiment Nos. 41 and 42.*—This was a wonderfully good field manured fairly, but not very heavily. Cultivator said he gets better crops sometimes. Incidence on the double crop comes to 16·11 per cent. |
| 37 15 11 | Do. | 51·92 | 0 8 | Do. | | $57\frac{2}{3}$ vál, $21\frac{1}{9}$ castor. | $1\frac{2}{3}$ ... | |
| 38 14 4 | 11 9 7 | 29·82 | 0 4 | Do | | $51\frac{1}{4}$ | 400 bundles. | *Experiment Nos. 43 and 44.*—*Vál* outturn affected adversely by the shade of mango trees, whose produce is, however, valuable. Incidence on the double crop 23·76 per cent. |
| 9 14 5 | Do. | 117·14 | 0 4 | Do. | | $57\frac{2}{3}$ vál, $21\frac{1}{9}$ castor. | $1\frac{1}{10}$ ... | |
| 37 1 2 | 17 13 5 | 48·11 | 0 4 | Do. | | $51\frac{1}{4}$ | 400 bundles | *Experiment No. 45.*—Sugarcane followed the rice. Only rice, therefore, was tested and the incidence is on the first crop alone. Field always grows a second crop of *vál* or is planted with sugarcane. |
| 70 8 11 | 18 9 1 | 26·31 | 0 4 | Do. | | $38\frac{1}{2}$ | $13\frac{1}{7}$ | *Experiment No. 46.*—No second crop this year. Incidence, therefore, on the rice crop only. The field usually grows *Kada* rice followed by a second crop of *vál*. |
| 272 8 0 | 8 4 11 | 3·04 | 0 1 | Do. | | $20\frac{1}{2}$ | ... | *Experiment No. 47.*—Malbári cane, which is superior, does not grow near the village of Jalálpor. By-products not valued. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village, and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. T. R. Fernandez, Dy. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 48 | Jalálpor (Munsád) ... | 519 Pot No. 2 | ... 0 38 | ... 9 8 0 (0 8 0 water-rate). | Sugarcane (Malbári), 17th November 1895. | 16 | 5,250 | 2,600 canes. | 8,049 Gol. | 1,480 bundles dry leaves. |
| 49 | Do. (do.) ... | 481 | 2 34 | 26 8 0 (1 8 0 water rate) | Do. (do.), 18th January 1896. | 18 | 6,125 | 2,550 do. | 8,972 do. | 1,260 bundles dry leaves. |
| | *Mr. B. Robertson, Assistant Collector.* | | | | | | | | | |
| | *Do. (Supa) ...* | *271* | *4 18* | *41 8 0* | *Do. (do.) 10th December 1886.* | *16* | *5,250* | *1,867* do. | *5,325* do. | *173 bundles green leaves and tops.* |
| | *Mr. R. A. L. Moore, Assistant Collector.* | | | | | | | | | |
| | *Do. (A't) ...* | *306* | *1 30* | *19 8 0 (including water-rate).* | *Do. (Vánsi), 5th January 1888.* | *20* | *7,000* | *1,436* do. | *7,666* do. | *2,533 bundles dry canes. 533 bundles green tops. 8,000 bundles leaves.* |
| | *Mr. H. Maconochie, Assistant Collector.* | | | | | | | | | |
| | *Do. (Hansápor)* | *94 Kiari.* | *2 9 1 37* | *29 6 0 28 4 0 (10 12 7 water-rate).* | *Do. (do.) 3rd February 1891.* | *16* | *5,250* | *1,777* do. | *5,230* do. | *6,480 green tops.* |
| | *Mr. W. Doderet, Assistant Collector.* | | | | | | | | | |
| | *Do. (Munsád) ...* | *523* | *3 22* | *55 10 0 (17 13 9 water rate).* | *Do. (Malbári and Vánsi mixed), 14th December 1893.* | *17* | *5,690* | *21,600 sets.* | *5,712* do. | *1,400 bundles dry leaves.* |
| | *Mr. P. R. Cadell, Assistant Collector.* | | | | | | | | | |
| | *Do. (A't) ...* | *423 Pot No. 2* | *0 34 0 24* | *9 4 0 8 2 0* | *Do. (Vánsi), 27th January 1895.* | *16* | *5,250* | *2,084 canes.* | *4,945* do. | *5,010 bundles leaves.* |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 464 4 9 | 10 0 0 | 2·15 | 0 1 | 36 | $17\frac{3}{7}$ | 100 bundles. | *Experiment No. 48.*—Heavily manured sugarcane on a rice field growing this crop once in six years. |
| 494 11 7 | 9 4 9 | 1·83 | 0 2 | 36 | $18\frac{3}{5}$ | 100 do. | *Experiment No. 49.*—Sugarcane grown for the first time. |
| *250 0 0* | *9 5 3* | *3·73* | *0 3* | *37* | *22* | *16* do. | *For remarks, &c., vide Experiment No. 12 of Report for 1886-87.* |
| *505 4 5* | *11 2 3* | *2·20* | *0 3* | *$37\frac{1}{2}$* | *19* | *63 bundles dry canes; 20 green tops; 200 dry leaves.* | *Do. No. 16 of Report for 1887-88.* |
| *311 10 6* | *14 10 9* | *4·52* | *0 4* | *Do.* | *18* | *$2\frac{4}{7}$* | *Do. No. 24 of Report for 1890-91.* |
| *268 4 0* | *15 10 8* | *5·83* | *0 4* | *Do.* | *$22\frac{1}{2}$* | *100 bundles.* | *Do. No. 33 of Report for 1893-94.* |
| *265 2 3* | *13 8 8* | *5·10* | *0 4* | *Do.* | *$20\frac{3}{5}$* | *200 do.* | *Do. No. 23 of Report for 1894-95.* |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village, and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 50 | Jalápor (Jalálpor) ... | 521 | 4 21 | 53 0 0 (28 0 0 water rate). | Groundnut, 3rd February 1896. | 14 | 2,620 | 25 to 30 | 1,846 fresh nuts. | Not weighed. |
| | *Mr. J. W. A. Weir, Assistant Collector.* | | | | | | | | | |
| | *Do. (Eru) ...* | *491* | *7 8* | *25 8 0* | *Castor-seed, 28th March 1893.* | *11* | *360* | *14* | *415* | ..... |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 51 | Chorási (Magob) ... | 31 | 8 34 | 45 0 0 | Sorghum vulgare (Pirio Juvár), Cajanus indicus (Tuver), 19th December 1895. | 16 | 1,200 | 8<br>3⅓ | 1,149<br>46 | 410 bundles Kadbi; 35 light Juvár grain; 65 chaff; 210 Juvár heads. |
| 52 | Do. (do.) ... | 30 | 14 6 | 69 0 0 | Sorghum vulgare (Pirio Juvár), Cajanus indicus (Tuver), 19th December 1895. | 14 | 1,050 | 8<br>3⅓ | 1,092<br>18 | 335 bundles Kadbi; 45 light Juvár grain; 45 chaff; 200 Juvár heads; |
| 53 | Do. (Althán) ... | 21 | 9 17 | 47 8 0 | Sorghum vulgare (Pirio Juvár), Cajanus indicus (Tuver), 20th December 1895. | 12 to 13 | 900 or 975 | 6<br>3 | 754<br>14 | 295 bundles Kadbi; 57 chaff and light Juvár grain; 85 Juvár heads. |

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*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p | Rs. a. p | Per cent. | A. g. | Tolas. | Lbs. | Cwt. | |
| 58 8 0 | 11 11 5 | 20·02 | 0 1 | 37⅓ | 33 | ... | *Experiment No. 50.*—One crop of sugarcane and one of groundnut taken off the ground every three years. No manure applied to the groundnut. |
| *20 5 0* | *3 8 8* | *17·43* | *0 8* | *37* | *20½* | ... | *For details vide Experiment No. 43 of Report for 1892-93.* |
| 38 2 5 | 5 1 4 | 13·32 | 0 8 | 37½ | 42 juvár; 33½ tuver. | 53⅓ bundles. | *Experiment No. 51.*—The soil of Magob and Kumbhária is the best soil in the Chorási táluka, except possibly *bháta* soil. |
| 34 12 5 | 4 14 0 | 14·02 | 0 8 | Do. | 42 juvár; 33½ tuver. | 53⅓ Do. | *Experiment No. 52.*— Do. do. |
| 24 13 10 | 5 0 8 | 20·29 | 0 8 | Do. | 42 juvár; 33⅓ tuver. | 53⅓ Do. | *Experiment No. 53.*—Land somewhat salty. Yield slightly affected by short rainfall. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village, and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. C. N. Seddon, Assistant Collector* —continued. | | | | | | | | | |
| 54 | Chorási (Althán) ... | 26 | 5 8 | 32 8 0 | Sorghum vulgare (Pirio Juvár), 1st January 1896. | 16 | 1,200 | $6\frac{2}{3}$ | 1,136 | 310 bundles Kadbi; 77 chaff; 115 heads. |
| 55 | Do. (do.) ... | 24 | 3 23 | 20 8 0 | Do. (do.) 2nd January 1896. | 17 | 1,300 | $6\frac{2}{3}$ | 670 | 190 bundles Kadbi; 45 chaff; 75 heads. |
| | *Mr. J. Mollison, Superintendent of Farms.* | | | | | | | | | |
| 56 | Do. (Althán) ... | 19 | 5 11 | 32 0 0 | Do. (Sholápuri Juvár), Cajanus indicus (Tuver), 5th December 1895. | 18 | 1,400 | $6\frac{2}{3}$<br>$3\frac{1}{3}$ | 1,063<br>36 | 277 bundles Kadbi. |
| 57 | Do. (do.) ... | 49 | 8 6 | 49 8 0 | Do. (Deshi Juvár), Cajanus indicus (Tuver), 27th December 1895. | 20 | 1,600 | $6\frac{2}{3}$<br>$3\frac{1}{3}$ | 1,070<br>30 | 285 bundles Kadbi. |
| 58 | Do. (Magob) ... | 46 | 2 15 | 16 8 0 | Cotton (Three pickings), 22nd January to 21st February 1896. | 16 | 450 | 17 | 402 seed-cotton. | ..... |
| 59 | Do. (Althán) ... | 44 | 15 2 | 88 8 0 | Do. (Three pickings), 24th January to 23rd February 1896. | 20 | 600 | 12 | 394 Do. | ..... |
| 60 | Do. (do.) ... | 42 | 2 25 | 15 0 0 | Do. (Three pickings), 25th January to 23rd February 1896. | 20 | 600 | 12 | 387 Do. | ..... |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | | A. g. | Tolas. | Lbs. | Cwt. | |
| 33 13 3 | 6 4 0 | 18·47 | | 0 8 | 37½ | 42 | 53⅓ bundles. | *Experiment No. 54.*—Minor pulses also sown but their yield quite negligeable; practically they failed. |
| 20 2 6 | 5 11 9 | 28·45 | | 0 8 | Do. | 42 | 53⅓ Do. | *Experiment No. 55.*— Do. do. |
| 30 3 8 | 6 1 1 | 20·06 | | 0 8·37 | Do. | 42½ juvár; 32½ tuver, | 67 Do. | *Experiment No. 56.*—Minor by-products neglected by experimenter as a set off against non-cultivation of headland. |
| 31 4 5 | 6 1 2 | 19·41 | | 0 8 | Do. | 41 juvár; 32½ tuver. | 67 Do. | *Experiment No. 57.*—A very carefully tilled field. |
| 34 13 9 | 6 15 2 | 19·93 | | 0 8·9 | Do. | 11 7/13 | ... | |
| 34 1 11 | 5 14 1 | 17·23 | | 0 9·45 | Do. | 11 7/13 | ... | *Experiment No. 59.*—Anna valuation too high; 16 or 17 annas nearer the mark. |
| 33 8 11 | 5 11 5 | 17·02 | | 0 7·8 | Do. | 11 7/13 | ... | *Experiment No. 60.*—Field carefully cultivated though no manure applied. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas | Yield according to Formulæ. | Average per Seed. | Average per Yield of Principal Product. | Average per Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. J. Mollison. Superintendent of Farms*—contd. | | A. g | Rs. a. p. | | Annas | Lbs. | Lbs. | Lbs. | Lbs. |
| 61 | Chorási (Bhatár) ... | 119 | 2 36 | 16 8 0 | Cotton (Three pickings), 26th January to 23rd February 1896. | 18 | 525 | 12 | 348 seed-cotton. | ..... |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 62 | Do. (Althán) ... | 46 | 4 35 | 28 8 0 | Sesamum (Tal) 15th January 1896. | 12 | 450 | 1 | 202 seed. | ..... |
| 63 | Do. (do.) ... | 34 | 7 3 | 60 0 0 (24 6 0 water-rate) | Do. (do.) 17th January 1896. | 16 | 600 | 1 | 372 Do. | ..... |
| | *Mr. P. R. Mehta, Sub.-Assistant Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 64 | Do. (Kacholi) ... | 7<br>Pot No. | 1 34<br>0 28 | 20 0 0<br>7 10 0<br>(1 12 0 water-rate) | Rice (Kada), 12th October 1895. | 10 | 1,125 | 137 | 1,831 in husk. | 1,440 |
| 65 | Do (PárdiRákob.) | 5<br>Pot No | 4 31<br>4 10 | 23 8 0<br>20 14 0 | Do. ... | 10 | 1,125 | 150 | 1,533 Do. | 1,320 |
| 66 | Do. (Sámrod) .. | 43 | 3 13 | 13 2 0 | Do. ... | 12 | 1,350 | 119 | 1,874 Do. | 1,480 |
| 67 | Do. (Kaphleta) ... | 131<br>Pot No. | 1 15<br>0 14 | 11 8 0<br>3 0 0 | Do. ... | 10 | 1,125 | 81 | 1,762 Do. | 1,620 |
| 68 | Do. (Talangpor)... | 148<br>Pot No. | 0 26<br>0 6 | 8 10 0<br>1 12 0<br>(0 8 0 water-rate). | Do. ... | 14 | 1,575 | 128 | 2,975 Do. | 2,720 |
| 69 | Do. (Páli) .. | 41<br>Pot No. | 2 18<br>0 2 | 24 8 0<br>0 10 0<br>(0 2 2 water-rate) | Do. .. | 12 | 1,350 | 70 | 2,115 Do. | 2,800 |
| | *Mr. D. N. Nánivati, District Deputy Collector.* | | | | | | | | | |
| | *Do. (Kaphleta) ..* | *231*<br>*Rice.* | *1 8*<br>*1 1* | *20 4 0*<br>*19 8 0*<br>*(8 14 0 water-rate).* | *Dolichos lablab (Vál), 14th March 1891.* | *16* | *675* | *76* | *1,732* | *2,070 chaff; 1,605 stalks.* |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser. | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas | | Lbs. | Cwts. | |
| 30 2 3 | 5 11 0 | 18·87 | 0 6·9 | 37½ | | 11 7/13 | ... | *Experiment No. 61.*—Crop 12 annas according to formulæ. Anna valuation high. |
| 14 0 7 | 5 13 6 | 41·63 | 0 8 | Do. | | 14 3/7 | ... | *Experiment No. 62.*—A commoner crop in Olpád. Its cultivation may spread as it is a good preparation for cotton. |
| 25 13 3 | 8 7 8 | 32·82 | 0 8 | Do. | | 14 3/7 | ... | |
| 41 1 0 | 10 14 3 | 26·52 | 0 1 | Do. | | 47⅓ | 5⅓ | *Experiment No. 64.*—No second crop this year. Incidence on the first crop only. The field has grown a second crop 6 times out of the last 9 years. |
| 34 9 0 | 4 14 7 | 14·21 | 0 1 | Do. | | Do. | Do. | *Experiment No. 65.*—New rice land. No second crop this year. Incidence on the rice alone. The field has grown a second crop 6 times out of the last 7 years. |
| 42 1 3 | 3 15 2 | 9·37 | 0 1 | Do. | | Do. | Do. | *Experiment No. 66.*—Converted into rice land in 1891. No second crop this year. Incidence on the rice alone. The field has only once grown a second crop since it was converted. |
| 39 15 0 | 8 9 2 | 21·46 | 0 1 | Do. | | Do. | Do. | *Experiment No. 67.*—No second crop. Incidence on the rice only. Has grown a second crop of *vál* 4 times during the last 9 years. |
| 67 5 10 | 11 10 8 | 17·31 | 0 1 | Do. | | Do. | Do. | *Experiment No. 68.*—Has had a second crop of *vál* this year but it was found impossible to get to the field to test the *vál*. Incidence therefore on rice alone. |
| 49 5 8 | 12 8 0 | 25·32 | 0 2 | Do. | | Do. | Do. | *Experiment No. 69.*—Only rice tested. The field has grown a second crop of *vál* 7 times out of the last 9 years. Incidence on the first crop only. |
| *50 13 9* | *19 0 4* | *37·39* | *0 4* | *Do.* | | *57* | *1 chaff; 5½ stalks.* | *Second crop after rice. Incidence on it alone. For other remarks, vide Experiment No. 25 of Report for 1890-91.* |

Figures in columns 5 and 13

| No. | Taluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharab. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g | Rs a. p. | | Annas | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 70 | Chorási (Kumbhária.) | 183 | 2 22 | 43 0 0 (18 0 0 water-rate) | Sugarcane (Surti Meva), 4th January 1896. | 12 | ... | 9,360 sets. | 37,600 canes. | ..... |
| 71 | Do. (Magob) ... | 27 | 9 10 | 118 8 0 (66 0 0 water-rate). | Do. 7th November 1895. | 16 | ... | 7,200 do. | 47,360 do. | ..... |
| 72 | Do. (Adájan) ... | 14 | 2 12 | 43 0 0 | Do. 6th December 1895. | 12 | ... | 9,000 do. | 39,320 do. | ..... |
| | | Pot No. 2 | 0 25 | 11 10 0 | | | | | | |
| 73 | Do. ( do. ) ... | 47 | 1 8 | 22 8 0 | Do. ... | 14 | ... | 9,000 do. | 32,640 do. | ..... |
| | | Pot No. 2 | 0 25 | 11 12 0 | | | | | | |
| | *Mr. J. Mollison, Superintendent of Farms.* | | | | | | | | | |
| 74 | Do. (Adájan) ... | 27 | 1 6 | 20 8 0 | Do. 13th December 1895. | 16 | ... | 9,600 do. | 26,188 canes, 7,550 pieces (number) | ..... |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 75 | Do. (Kumbhária) . | 285 | 2 35 | 37 0 0 (14 13 0 water-rate). | Groundnut, 10th December 1895. | 10 | 1,875 | 120 | 1 206 in shell. | 4,800 |
| | *Mr. J. Mollison, Superintendent of Farms.* | | | | | | | | | |
| 76 | Do. ( do. ) ... | 229 | 2 37 | 15 8 0 | Do. 14th February 1896. | 14 | 2,650 | 75 | 1,620 in shell. | Not weighed. |
| | *Mr. C. N. Seddon, Assistant Collector.* | | | | | | | | | |
| 77 | Do. (Magob) ... | 69 | ... | ... | Cabbages, 11th December 1895. | 13 | ... | ¼ | 10,107 (number of cabbages) | ..... |
| | | Pot No. 2 | 1 31 | 21 10 0 (13 0 0 water-rate). | | | | | | |
| | *Mr. J. Mollison, Superintendent of Farms.* | | | | | | | | | |
| 78 | Do. ( do. ) ... | 27 | 9 10 | 118 8 0 (66 0 0 water-rate). | Do. 22nd February 1896. | 16 | ... | 8 | 11,596 do. | ..... |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | | Lbs. | Cwt. | |
| 200 0 0 | 16 13 10 | 8·43 | 0 1 | ... | | 188 canes. | ... | *Experiment No. 70.*—All sugarcanes tested in the Chorási táluka are eating canes. Formulæ do not give the yield for this cane. In column 17 only the average value is shown; for details see remarks in the analysis. |
| 296 0 0 | 12 13 0 | 4·32 | 0 1 | ... | | 160 do. | ... | *Experiment No. 71.*— Do. do. |
| 191 1 7 | 18 9 7 | 9·73 | 0 1 | ... | | 206 do. | ... | *Experiment No. 72.*—Sugarcane on *bháta* land. |
| 227 8 0 | 18 12 10 | 8·26 | 0 1 | ... | | 144 do. | ... | *Experiment No. 73.*—Land similar to above. Crop damaged a little by rats and jackals and affected a little by blight. |
| 286 4 7 | 17 13 3 | 6·23 | 0 0·53 | ... | | 130 canes. 274 pieces. | ... | *Experiment No. 74.*—Land as above. Sugarcane grown once in five years. |
| 55 2 7 | 12 13 11 | 23·32 | 0 1 | 37½ | | 25⅔ | 5⅕ | *Experiment No. 75.*—Outturn very poor; reason unknown. |
| 75 11 4 | 5 4 9 | 6·99 | 0 4·53 | Do. | | 22 | ... | *Experiment No. 76.*—Outturn very poor. |
| 829 4 3 | 12 2 11 | 1·47 | 0 2·05 | ... | | 12 cabbages. | ... | *Experiment No. 77.*—High prices obtained in the *Bombay* market owing to earliness of the crop. See detailed notes in the analysis. |
| 362 6 0 | 12 13 0 | 3·53 | 0 0·89 | ... | | 32 do. | ... | *Experiment No. 78.*—Price obtained in the *Surat* market for later crop. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. J. Mollison, Superintendent of Farms*—continued. | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| 79 | Chorási (Magob) ... | 49 | 3 2 | 27 0 0 (12 0 0 water rate). | Yams (Bhusra Ratálu), 9th December 1895. | 10 | 2,810 | 5,440 sets. | 8,061 | ..... |
| 80 | Do. ( do. ) ... | 35 | 5 35 | 77 8 0 (44 0 0 water-rate). | Turmeric (Haldar), Yams (Talabda Ratálu), 21st January 1896. | 16 | 3,000<br>4,500 | 2,340<br>4,320 do. | 13,570<br>6,020 | ..... |
| 81 | Do. ( do. ) ... | 27 | 9 10 | 118 8 0 (66 0 0 water-rate.) | Turmeric (Haldar), Yams (Talabda Ratálu), 22nd February 1896. | 16 | 3,000<br>4,500 | 2,140<br>5,700 do. | 14,842<br>9,014 | ..... |
| 82 | Do. (Kumbhária). | 115<br>118 | 0 30<br>0 18 | 59 8 0 (40 15 0 water-rate.) | Onions (White), 15th February 1896. | 14 | 9,200 | 1,000 small bulbs. | 11,836 | ..... |
| 83 | Do. (do). .. | 285 | 2 35 | 37 0 0 (14 13 0 water-rate.) | Sweet potatoes (Sakaria), 24th February 1896. | 14 | 7,220 | ... | 8,509 | ..... |
| | *Do. (do).* ... | *216* | *1 24* | *28 0 0 (13 8 0 water-rate.)* | *Potatoes, 23rd February 1894.* | *15* | *9,140* | *788* | *7,513* | ..... |
| 84 | Olpád (Safetabad) ... | 10 | 6 8 | 31 6 0 | Sorghum vulgare (Juvár), 29th December 1895. | 20 | 1,600 | $6\frac{2}{3}$ | 575 | 200 bundles. |
| 85 | Do. (Másma) ... | 73 | 5 16 | 30 0 0 | Sorghum vulgare (Juvár), Cajanus indicus (Tuver), 29th December 1895. | 20 | 1,600 | $6\frac{2}{3}$<br>5 | 781<br>42 | 353 do. |
| 86 | Do. (Saroli) ... | 93 | 5 9 | 32 8 0 | Sorghum vulgare (Juvár), 30th December 1895. | 20 | 1,600 | $6\frac{2}{3}$ | 735 | 310 do. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment, excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | | A. g. | Tolas. | Lbs. | Cwt. | |
| 104 12 8 | 8 13 8 | 8·45 | | 0 4·25 | 37½ | 77 | ... | *Experiment No. 79.*—Formulæ yield certainly wrong. |
| 213 7 9 | 13 3 1 | 6·17 | | 0 4 | Do. | 109⅝ turmeric, 66⅝ yams. | ... | *Experiment No. 80.*—Outturn in column 10 represents weight of uncleaned product. The cleaned product is $\frac{11}{16}$ of the uncleaned article. |
| 269 13 2 | 12 13 0 | 4·74 | | 0 · 4·18 | Do. | 109⅝ turmeric 66⅝ yam. | ... | *Experiment No. 81.*—Outturn in column 10 represents weight of unclean product. The clean product is $\frac{11}{16}$ of the uncleaned article. Tillage very good. |
| 173 1 7 | 27 0 9 | 15·62 | | 0 2·2 | Do. | 68½ | ... | *Experiment No. 82.*—The field tested was Survey No. 115. As both the Survey Nos. (115 and 118) given, pay a lump sum together for the well both have been shown in columns 4-6 and average assessment per acre in column 13 based thereon. |
| 203 6 10 | 12 13 11 | 6·32 | | 0 2·125 | Do. | 41⅝ | ... | *Experiment No. 83.*—Outturn much higher than in Bárdoli experiments. |
| *141 6 8* | *17 8 0* | *12·37* | | *0 4·117* | *Do.* | *53⅛* | ... | *Outturn high. For remarks vide Experiment No. 37 of Report for 1893-94.* |
| 16 8 5 | 5 0 11 | 30·60 | | 0 8 | Do. | 41 | 80 bundles. | *Experiment No. 84.*—Anna estimate perhaps too high. Subordinate pulses not tested. |
| 23 13 11 | 5 8 11 | 23·27 | | 0 8·5 | Do. | 41 juvár, 32½ tuver. | 100 do. | *Experiment No. 85.*—Anna estimate high. |
| 21 13 1 | 6 3 6 | 28·50 | | 0 8 | Do. | 41 | 80 do. | *Experiment No. 86.*—Subordinate crops, untested but as the *juvár* was good, probably insignificant. |

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. J. Modlison, Superintendent of Farms*—continued. | | A. g. | Rs. a. p | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| 87 | Olpád (Saroli) .. | 64 | 10 34 | 58 8 0 | Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 30th December 1895. | 20 | 1,600 | 6⅓<br>5 | 888<br>24 | 256 bundles. |
| 88 | Do. (Ambheta) ... | 324 | 11 15 | 54 0 0 | Sorghum vulgare (Juvár), 1st January 1896. | 16 | 1,200 | 6⅔ | 313 | 169 do. |
| 89 | Do. (do.) ... | 280 | 6 36 | 40 0 0 | Do. 1st January 1896. | 20 | 1,600 | 11⅔ | 1,005 | 255 do. |
| | *Mr. Umedrám Ranchoddás, District Deputy Collector.* | | | | | | | | | |
| | *Do. (Sandhiar) ...* | *206* | *6 35* | *44 0 0* | *Do. 11th January 1888.* | *16* | *1,200* | *8½* | *677* | *1,564* |
| | *Do. (Takárma) ...* | *150* | *4 7* | *25 0 0* | *Do. 16th January 1888.* | *16* | *1,200* | *6⅐* | *741* | *1,680* |
| | *Do. (Saras) ...* | *325* | *7 32* | *42 8 0* | *Do. 15th January 1889.* | *16* | *1,200* | *8* | *781* | *3,275* |
| | *Do. ( do. ) ..* | *289* | *12 0* | *60 0 0* | *Do. 16th January 1889.* | *16* | *1,200* | *8* | *484* | *2,245* |
| | *Mr. J. Mollison, Superintendent of Farms.* | | | | | | | | | |
| 90 | Olpád (Másma) ... | 78 | 1 30 | 9 6 0 | Cotton (Three pickings), 23rd January to 25th February 1896. | 18 | 525 | 16⅓ | 362 seed cotton. | ..... |
| 91 | Do. ( do. ) ... | 160 | 2 8 | 13 0 0 | Do. (Three pickings), 23rd January to 26th February 1896. | 10 to 12 | 280 335 | 16⅔ | 268 do. | ..... |
| 92 | Do. (Saroli) ... | 107 | 2 1 | 12 4 0 | Do. (Three pickings), 27th January to 23rd February 1896. | 20 | 600 | 16⅔ | 575 do. | ..... |
| 93 | Do. ( do. ) ... | 75 | 5 6 | 36 8 0 | Cotton (Three pickings), 27th January to 23rd February 1896. | 16 | 450 | 16⅔ | 352 seed cotton. | ..... |
| 94 | Do. (Ambheta) ... | 225 | 4 27 | 24 0 0 | Do. (Three pickings), 28th January to 26th February 1896. | 18 | 525 | 16⅔ | 327 do. | ..... |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | | | Assessment excluding Local Funds. | | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight per. | Principal Product. | By-Product. | |
| 12 | | | 13 | | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. | a. | p. | Rs. a. | p. | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 26 | 3 | 9 | 5 6 | 3 | 20·54 | 0 5 | 37½ | 41 juvár, 32½ tuver. | 67 bundles. | *Experiment No. 87.*—Outturn better than in any of the last three. Still anna-valuation too high. |
| 9 | 12 | 0 | 4 11 | 11 | 48·66 | 0 8·3 | Do. | 41 | 80 do. | *Experiment Nos. 88 and 89.*—The village is divided into a good and, chiefly owing to water-logging, a bad half. The first experiment was taken in the bad and the second in the good. Subordinate pulses not tested. |
| 27 | 11 | 2 | 5 12 | 9 | 20·92 | 0 8 | Do. | 41 | 80 do. | |
| *26* | *1* | *9* | *6 6* | *5* | *24·51* | *0 9* | *37* | *34* | *2¼* | *Subordinate pulses not tested. For detailed remarks vide Experiment No. 19 of Report for 1887-88.* |
| *27* | *7* | *7* | *5 15* | *9* | *21·78* | *0 9* | Do. | *35* | *2¼* | *Do. do. Experiment No. 20 of Report for 1887-88.* |
| *27* | *13* | *10* | *5 7* | *2* | *19·55* | *0 8* | 37 | *38* | *4* | *Do. do. Experiment No. 71 of Report for 1888-89.* |
| *17* | *11* | *9* | *5 0* | *0* | *28·19* | *0 8* | *37½* | *38* | *4* | *Do. do. No. 12 of Report for 1888-89.* |
| 31 | 6 | 0 | 5 5 | 9 | 17·08 | 0 11·6 | Do. | $11\frac{7}{13}$ | ... | *Experiment No. 90.*—Fair average crop for good villages in the south-east of the táluka. |
| 23 | 8 | 7 | 5 14 | 7 | 25·45 | 0 13 | Do. | $11\frac{7}{13}$ | ... | *Experiment No. 91.*—Crop under average for the village. |
| 49 | 13 | 4 | 6 0 | 9 | 12·13 | 0 8 | Do. | $11\frac{7}{13}$ | ... | *Experiment No. 92.*—Specially selected as a first class crop. The land has been grass land till lately. |
| 30 | 8 | 1 | 7 1 | 5 | 23·23 | 0 7·9 | Do. | $11\frac{7}{13}$ | ... | *Experiment No. 93.*—An average crop like that in Experiment No. 90. |
| 28 | 5 | 8 | 5 2 | 2 | 18·11 | 0 11·3 | Do. | $11\frac{7}{13}$ | ... | *Experiment No. 94.*—Anna estimate very high. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. A. G. Kotvál, District Deputy Collector.* | | | | | | | | | |
| | *Olpád (Barbodhan)* ... | *285* | *1 24* | *18 8 0* | *Rice (Mánjarvel), 19th November 1892.* | *16* | *1,350* | *112* | *2,267 in husk.* | *2,609* |
| | *Do. (Okha)* ... | *31* | *5 23* | *46 8 0* | *Do. (Sáliu), 15th October 1893.* | *20* | *1,800* | *76* | *2,392 do.* | *3,100* |
| | *Do. (Bhesán)* ... | *127 Pot No. 6* | ... *0 16* | ... *5 13 0 (0 13 0 water-rate).* | *Do. (Kada), 21st October 1893.* | *20* | *1,800* | *68* | *3,586 do.* | *4,850* |
| | *Do. (Sáyan)* ... | *379* | *3 4* | *36 8 0* | *Do. (Mánjarvel), 13th November 1893.* | *20* | *1,800* | *67* | *3,144 do.* | *6,190* |
| | *Mr. Umedrám Ranchoddás, District Deputy Collector.* | | | | | | | | | |
| | *Do. (Segwa)* ... | *28* | *12 3* | *61 8 0* | *Wheat, 19th February 1890.* | *8* | *525* | *12 to 17* | *573* | *600* |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 95 | Balasár (Málvan) ... | 444 | 0 24 | 0 13 0 | Grass, 17th November 1895. | 16 | ... | ... | 1,024 bundles | ..... |
| 96 | Do. (Vásan) ... | 155 | 10 28 | 14 0 0 | Do. 18th November 1895. | 16 | ... | ... | 1,352 do. | ..... |
| 97 | Do. ( do. ) ... | 176 Pot No. 1 | ... 1 1 | ... 1 4 0 | Do. ... | 16 | ... | ... | 1,600 do. | ..... |
| | *Mr. Pránlál Harkisandás, District Deputy Collector.* | | | | | | | | | |
| 98 | Do. (Gundláo) ... | 274 | 1 34 | 26 0 0 (9 11 5 water-rate.) | Rice (Kada), 21st October 1895; followed by | 7 | 985 | 130 | 1,166 in husk. | 1,452 |
| 99 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál), 15th March 1896. | 13 | 580 | 50 | 753 | 540 |
| 100 | Do. (Nandávla) ... | 122 | 2 26 | 21 0 0 | Rice (Vánkvel), 21st October 1895; followed by | 12 | 1,690 | 141 | 1,974 in husk. | 3,232 |
| 101 | Do. (do.) ... | Do. | Do. | Do. | Pisum sativum (Vatána, Peas) 16th February 1896. | 8 | 320 | 55 | 631 | 5 |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent | | A. g. | Tolas. | Lbs. | Cwts. | |
| 46 6 6 | 11 9 0 | 24·91 | | 0 4 | 37 | $51\frac{2}{3}$ | $6\frac{1}{6}$ | *Second crop may or may not be grown. Incidence only on the rice. For other remarks vide Experiment No. 47 of Report for 1892-93.* |
| 57 2 5 | 8 5 5 | 14·59 | | 0 4 | Do. | $44\frac{4}{13}$ | $8\frac{6}{7}$ | *Do. do. vide Experiment No. 34 of Report for 1893-94.* |
| 79 1 8 | 14 8 6 | 18·37 | | 0 4 | Do. | $48\frac{1}{2}$ | $8\frac{13}{14}$ | *Second crop occasionally taken. Incidence on rice alone, vide Experiment No. 35 of Report for 1893-94.* |
| 77 4 7 | 11 12 4 | 15·23 | | 0 4 | Do. | $44\frac{4}{13}$ | $8\frac{6}{7}$ | *Second crop sometimes taken and sometimes not. Incidence on rice alone. Vide Experiment No. 36 of Report for 1893-94.* |
| 23 4 7 | 5 1 6 | 21·96 | | 1 10 | Do. | 28 | $1\frac{3}{4}$ | *Dry-crop unmanured wheat. For detailed remarks vide Experiment No. 24 of Report for 1889-90.* |
| 7 2 8 | 1 5 8 | 18·89 | | 0 10 | ... | 143 bundles. | ... | *Experiment Nos. 95 to 97.*—Bundles large in Nos. 95 and 96, but those in No. 97 smaller; hence valued cheaper. |
| 9 7 5 | 1 4 11 | 13·82 | | 0 10 | ... | 143 do. | ... | |
| 8 0 0 | 1 3 6 | 15·23 | | 0 10 | ... | 200 do. | ... | |
| 27 11 2 | 14 0 10 | 52·73 | | 0 10 | $37\frac{1}{2}$ | $45\frac{1}{2}$ | $6\frac{1}{4}$ | *Experiment Nos. 98 and 99.*—Incidence on the two crops together comes to 32·00 per cent. But price of *Kada* rice given by Mr. Pránlál far too high. Better, therefore, to take the value of the rice outturn at Rs. 25-8-0 when the incidence on double crop comes to about 34 per cent. |
| 16 3 5 | Do. | 86·66 | | 0 8 | Do. | $57\frac{1}{2}$ | $1\frac{4}{7}$ | |
| 50 8 8 | 7 14 10 | 15·69 | | 0 10 | Do. | 43 | $6\frac{1}{4}$ | *Experiment Nos. 100 and 101.*—Incidence on double crop 10·69 per cent. Rice valued too high. Valued at $47\frac{1}{2}$ lbs. per rupee, the value of total outturn comes to Rs. 69-13-0 and the incidence to 11·35 per cent. |
| 23 9 11 | Do. | 33·56 | | 0 8 | Do. | 32 | $1\frac{3}{7}$ | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 102 | Balsár (Dhamdáchi)... *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | 174 | 1 21 | 20 0 0 (6 0 1 water-rate.) | Rice (Vánkvel), 22nd October 1895; followed by | 16 | 2,250 | 151 | 2,025 in husk. | 3,120 bundles. |
| 103 | Do. ( do. )... *Mr. F. X. D'Souza, Assistant Collector.* | Do. | Do. | Do. | Dolichos lablab (Vál), 15th March 1896. | 4 | 180 | 60 | 207 | 160 leaves, 135 stalks. |
| 104 | Do. (Chikhla) .. *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | 305 Pot No. 5 | ... 0 17 | ... 6 6 0 (2 3 8 water-rate.) | Rice (Kada), 23rd October 1895; followed by | 12 | 1,690 | 141 | 651 in husk. | 2,580 bundles. |
| 105 | Do. ( do. ) ... *Mr. F. X. D'Souza, Assistant Collector.* | Do. | Do. | Do. | Dolichos lablab (Vál), 15th March 1896. | 5 | 225 | 40 | 286 | 105 leaves, 160 stalks. |
| 106 | Do. (Sarodhi) ... *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | 225 Pot No. 1 | ... 0 18 | ... 8 0 0 (4 2 2 water-rate.) | Rice (Kada), 23rd October 1895; followed by | 10 | 1,400 | 145 | 1,218 in husk. | 1,700 bundles. |
| 107 | Do. ( do. ) .. *Mr. F. X. D'Souza, Assistant Collector.* | Do. | Do. | Do. | Lathyrus sativus (Láug), 27th February 1896. | 9 | 340 | 35 | 441 | 377 leaves, 103 stalks. |
| 108 | Do. (Párnera) ... *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | 389 Pot No. 1 | ... 0 34 | ... 1 6 0 | Rice (Kada), 21st October 1895; followed by | 20 | 3,000 | 185 | 2,984 in husk. | 1,620 bundles. |
| 109 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál), 27th February 1896. | 8 | 360 | 40 | 388 | 344 leaves, 174 stalks. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 45 12 0 | 13 1 10 | 28·66 | 0 4 | 37½ | 47½ | 1,000 bundles. | *Experiment Nos. 102 and 103.*—For the valuation of straw in all Mr. D'Souza's rice experiments see analysis. Incidence on double crop comes to 25·91 per cent. |
| 4 13 9 | Do. | 269·88 | 0 24 | Do. | 57½ | 1 2/7 leaves, 5 5/7 stalks. | |
| 35 4 6 | 15 0 0 | 42·51 | 0 4 | Do. | 50½ | 1,000 bundles. | *Experiment Nos. 104 and 105.*—Incidence on the two crops 36·40 per cent. |
| 5 14 9 | Do. | 253·29 | 0 8 | Do. | 57½ | 1 2/7 leaves, 5 5/7 stalks. | |
| 25 11 11 | 17 12 5 | 69·05 | 0 4 | Do. | 50½ | 1,000 bundles. | *Experiment Nos. 106 and 107.*—Incidence on the double crop comes to 48·56 per cent. |
| 10 13 11 | Do. | 163·53 | 0 7 | Do. | 50 | 1 11/24 leaves, 5 5/7 stalks. | |
| 60 11 2 | 1 9 10 | 2·66 | 0 4 | Do. | 50½ | 1,000 bundles. | *Experiment Nos. 108 and 109.*—New rice land. Anna estimate for first crop too high. Incidence on double crop 2·30 per cent. |
| 9 4 11 | Do. | 17·34 | 0 8·5 | Do. | 57½ | 1 3/8 leaves, 5 5/7 stalks. | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 110 | Balsár (Ronvel) ... | 20 | 1 33 | 17 8 0 (7 4 10 water-rate). | Rice (Vánkvel), 26th October 1895. | 18 | 2,625 | 145 | 2,728 in husk. | 2,630 bundles. |
| | *Mr. W. Doderet, Assistant Collector.* | | | | | | | | | |
| | *Do. (Balsár) ...* | *61* | *2 3* | *29 8 0* | *Do. (Kada), 15th October 1893.* | *15* | *2,110* | *229* | *2,094* | *2,531* |
| | *Do. ( do. ) ...* | *105* | *2 26* | *25 8 0* | *Do. ( do. )...* | *18* | *2,625* | *181* | *2,698 in husk.* | *3,773* |
| | *Do. ( do. ) ...* | *546* | *3 31* | *87 0 0* | *Do. ( do. )...* | *20* | *3,000* | *153* | *2,629 Do.* | *3,553* |
| | *Mr. E. H. E. Leggatt, Assistant Collector.* | | | | | | | | | |
| | *Do. (Abráma) ..* | *31* | *0 30* | *10 13 3* | *Dolichos lablab (Vál), 18th January 1893.* | *10* | *445* | *73½* | *1,046* | *2,950* |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 111 | Do. (Balsár) ... | 22 and 23 | 0 32 0 16 | 13 10 0 7 0 0 | Sugarcane (Mal bári), 19th November 1895. | 16 | 4,875 | 1,860 canes. | 7,420 gol. | 1,260 bundles dry leaves. |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 112 | Do. (Kháparváda)... | 463 | 0 11 | 5 8 0 | Do. ( do. ), 15th November 1895. | 16 | 4,875 | 1,800 Do. | 8,830 Do. | 2,420 Do. |
| | *Mr. Syad Nuruddin Khán, Assistant Collector.* | | | | | | | | | |
| | *Do. (Abráma) ...* | *336 Pot No. 4* | *5 16 1 7* | *65 8 0 14 4 0* | *Do. (Khajurdi), 6th December 1890.* | *14* | *4,260* | *1,800 Do.* | *8,584 Do.* | *22,760 tops and leaves.* |
| | *Do. (Párdi Haria) ...* | *5 Kiári.* | *6 19 5 6* | *66 14 0 64 0 0* | *Do. (Malbári), 11th December 1890.* | *13* | *3,960* | *1,800 Do.* | *8,718 Do.* | *14,456 Do.* |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | Area of Test. | Equivalent in Tolas of local weight per. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | | Assessment, excluding Local Funds. | | Incidence of Assessment on the Value of Gross Produce | | | Principal Product. | By-Product. | |
| 12 | | 13 | | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | | Rs. a. p. | | Per cent. | A. g. | Tolas. | Lbs. | Cwt. | |
| 60 0 11 | | 9 9 5 | | 15·96 | 0 4 | 37½ | 47½ | 1,000 bundles | *Experiment No. 110.*—No second crop this year, Incidence on rice alone. Second crop almost always grown. |
| *51 3 10* | | *14 3 5* | | *27·74* | *0 4* | *37½* | *43* | *9* | *Seed rates probably too high. Second crop (lang) was not tested. Incidence on the rice alone. Lang always grown. For other remarks vide Experiment No. 30 of Report for 1893-94.* |
| *63 1 3* | | *9 9 11* | | *15·25* | *0 4* | *Do.* | *45* | *10 5/7* | *Incidence on rice only. Second crop grown when the land is moist. Vide Experiment No. 31 of Report for 1893-94.* |
| *57 14 4* | | *23 0 9* | | *39 80* | *0 4* | *Do.* | *48* | *10 1/7* | *Incidence on rice only. Second crop of Val grown every year. Vide Experiment No. 32 of Report for 1893-94.* |
| *32 8 10* | | *13 9 8* | | *41·79* | *0 8* | *Do.* | *37* | *5* | *Second crop after rice. Incidence on it alone. Vide Experiment No. 41 of Report for 1892-93.* |
| 427 0 9 | | 17 3 0 | | 4·02 | 0 2 | 37½ | 18 1/5 | 64 bundles. | *Experiment No. 111.*—Field enriched by fresh soil from a grove and plenty of manure. |
| 493 1 10 | | 20 0 0 | | 4·05 | 0 2 | 37 | 19⅓ | 67 do. | *Experiment No. 112.*—Formulæ evidently wrong |
| *550 4 8* | | *12 1 11* | | *2·20* | *0 5* | *Do.* | *16 1/5* | *4 9/10* | *Liberally manured field. For remarks, &c., vide Experiment No. 18 of Report for 1890-91.* |
| *591 6 0* | | *12 6 9* | | *2·10* | *0 5* | | *15 1/5* | *7 3/5* | *No manure applied directly to the crop. Vide Experiment No. 19 of Report for 1890-91.* |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Feed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. Dárásha Dosábhái, District Deputy Collector.* | | | | | | | | | |
| | *Balsár (Vasiár)* ... | *89* | *11 12* | *21 0 0* | *Castor seed, 29th February 1892.* | *10* | *280* | *41* | *427 seed.* | ..... |
| | *Mr. E. H. E. Leggatt, Assistant Collector.* | | | | | | | | | |
| | *Do. (Párdi Párnera)* | *404* | *1 24* | *1 8 0* | *Do. 19th March 1893.* | *12* | *340* | *29* | *248 do.* | ..... |
| | *Do. ( do. )* | *387* | *1 9* | *1 5 0* | *Do. 21st March 1893.* | *10* | *280* | *31* | *180 do.* | ..... |
| | *Mr. Syad Nuruddin Khán, Assistant Collector.* | | | | | | | | | |
| | *Do. (Survada)* ... | *530* | *4 19* | *13 0 0* | *Gram, 11th March 1890.* | *8 to 10* | *320 to 400* | *37½* | *140* | *223* |
| | *Do. ( do. )* ... | *530* | *4 19* | *13 0 0* | *Pisum sativum (Vatána), Peas, 30th January 1891.* | *12* | *480* | *41* | *588* | *768* |
| | *Do. ( do. )* ... | *529* | *2 8* | *6 0 0* | *Dolichos lablab (Kadva Val), 4th March 1891.* | *10 to 12* | *450 to 530* | *58* | *370* | *811* |
| | *Mr. Dárásha Dosábhái, District Deputy Collector.* | | | | | | | | | |
| | *Do. (Abráma)* ... | *183* | *8 2* | *11 8 0* | *Paspalum scrobiculatum (Kodra), 7th December 1883.* | ... | ... | *21* | *1,866* | *3,493* |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 113 | Chikhli (Degám) ... | 912 | 6 26 | 14 8 0 | Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 17th December 1895. | 20 | 1,400 | 4 to 5 | 928 | 285 bundles Kadbi. |
| | | | | | | | | 1 to 3 | 66 | 65 stalks. |
| 114 | Do. (Bámanvel)... | 113 | 8 11 | 12 0 0 | Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 18th December 1895. | 20 | 1,400 | 4 to 5 | 603 | 245 bundles Kadbi. |
| | | | | | | | | 1 to 3 | 255 | 170 stalks. |

*Surat District, 1895-96*—continued.

are of the Original Survey

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | | A. g. | Tolas. | Lbs. | Cwt. | |
| 19 11 0 | 1 13 8 | 9·41 | | 0 8 | 37 | 21⅔ | ... | *Dry-crop black soil growing castor every year without manure. For remarks, &c., vide Experiment No. 25 of Report for 1891 92.* |
| 11 6 6 | 0 15 0 | 8·21 | | 0 8 | Do. | 22 | ... | *A sole crop on ordinary black soil. Vide Experiment No. 45 of Report for 1892-93.* |
| 8 4 11 | 1 1 1 | 12·90 | | 0 8 | Do. | 22 | ... | *Do. do. No. 46 of Report for 1892-93.* |
| 4 6 7 | 2 14 5 | 65·78 | | 0 6 | Do. | 32 | ... | *Tank land submerged till November. Vide Experiment No. 23 of Report for 1889-90.* |
| 17 9 3 | 2 14 6 | 16·53 | | 0 8 | Do. | 46½ | 1⅓ | *Do. do. No. 20 of Report for 1890-91.* |
| 15 0 0 | 2 12 3 | 18·43 | | 0 8 | Do. | 37 | 1½ | *Do. do. No. 21 of Report for 1890-91.* |
| 24 11 0 | 1 6 10 | 5·78 | | 0 6 | Do. | 77 | 2¼ | *For remarks, &c., vide Experiment No. 19 of Report for 1883-84.* |
| 24 10 5 | 2 2 10 | 8·83 | | 0 8 | 37½ | 43¼ juvár; 43¼ tuver. | 200 bundles kadbi; 2⅔ tuver stalks. | *Experiment No. 113.*—The soil of this and the following three experiments by Mr. Mehta is better than the ordinary Chikhli dry-crop soil. |
| 21 11 9 | 1 7 2 | 6·66 | | 0 8 | Do. | 43¼ juvár; 43¼ tuver. | 200 bundles kadbi; 2⅔ tuver stalks. | *Experiment No. 114.*—Field broken up for cultivation only since 1892-93. |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharab | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Feed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey*—continued. | | | | | | | | | |
| 115 | Chikhli (Edhal) ... | 335 | 2 0 | 5 0 0 | Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 20th December 1895. | 18 | 1,225 | 4 to 5<br>1 to 3 | 691<br>213 | 190 bundles Kadbi.<br>130 stalks. |
| 116 | Do. (Minkachh)... | 217 | 3 17 | 16 3 0 (5 10 0 water-rate). | Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 25th December 1895. | 18 | 1,225 | 4 to 5<br>1 to 3 | 757<br>525 | 280 bundles Kadbi.<br>382 stalks. |
| | *Mr. Umedrám Ranchoddás, District Deputy Collector.* | | | | | | | | | |
| | *Do. (Tankal) ...* | *471* | *6 30* | *15 0 0* | *Sorghum vulgare (Juvár) and Phaseolus mungo (Mag), 10th January 1884.* | *Good.* | ... | *13½* | *623*<br>*41* | ..... |
| | *Do. (Phadvel) ...* | *547* | *1 37 (recognised share).* | *2 2 0* | *Sorghum vulgare (Juvár), 17th December 1884.* | *16* | *1,050* | *11* | *1,456* | *200 bundles.* |
| | *Do. ( do. ) ...* | *844* | *6 17* | *6 0 0* | *Do. 18th December 1884.* | *16* | *1,050* | *11* | *1,285* | *210 do.* |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 117 | Do. (Alipur) .. | 474 Pot No. 3. | ...<br>0 16 | ...<br>4 12 0 (1 9 7 water-rate) | Rice (Kolamb), 10th November 1895. | 18 | 2,360 | 128 | 2,852 in husk. | 3,800 do. |
| 118 | Do. (Ránkuva) .. | 71 | 1 2 | 11 0 0 (3 15 0 water-rate). | Do. 11th November 1895; followed by | 14 | 1,770 | 89 | 2,015 do. | 3,000 do. |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 119 | Do. ( do. ) ... | Do. | Do. | Do. ... | Lathyrus sativus (Láng), 23rd February 1896. | 3 | 110 | 30 | 176 | 65 leaves, 155 stalks. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | | A. g. | Tolas. | Lbs. | Cwt. | |
| 22 6 0 | 2 8 0 | 11·17 | | 0 8 | 37½ | 43¼ juvár; 43¼ tuver. | 200 bundles kadbi; 2⅔ tuver stalks. | *Experiment No. 115.*—Field slightly superior to the above. Same crops grown every year. |
| 32 8 11 | 4 11 7 | 14·50 | | 0 8 | Do. | 43¼ juvár; 43¼ tuver. | 200 bundles kadbi; 2⅔ tuver stalks. | *Experiment No. 116.*—Field bears well assessment. Without water-rate assessment comes to Rs. 3-1-4 per acre and the incidence to 9·47 per cent. |
| *16 0 4* | *2 3 7* | *13·88* | | *0 6* | *37* | *48 juvár; 38½ mag.* | *5* | *For detailed remarks, &c., vide Experiment No. 17 of Report for 1883-84.* |
| *35 6 8* | *1 1 8* | *3·11* | | *0 8* | *37½* | *46* | ... | *High yield due to land lying fallow for 30 years previous to 4 years of cropping. Vide Experiment No. 37 of Report for 1884-85.* |
| *31 4 0* | *0 14 11* | *2·98* | | *0 8* | *Do.* | *46* | ... | *Do. do. No. 38 of Report for 1884-85.* |
| 83 9 3 | 11 14 0 | 14·20 | | 0 5 | Do. | 38½ | 400 bundles. | *Experiment No. 117.*—There was a second crop, but no experimenter was able to get to the field to test it. Incidence, therefore, on the rice alone. |
| 59 14 3 | 10 7 7 | 17·48 | | 0 4 | Do. | 38½ | 400 bundles. | *Experiment Nos. 118 and 119.*—Incidence on the double crop comes to 16·37 per cent. |
| 4 1 4 | 10 7 7 | 256·50 | | 0 8 | Do. | 50 | 1 2/11 leaves; 5 5/7 stalks. | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | A. g. | Rs. a. p. | | Annas. | Lbs | Lbs. | Lbs. | Lbs. |
| 120 | Chikhli (Surkhái) ... *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | 125 Pot No. 3 | ... 0 32 | ... 8 0 0 (3 0 0 water-rate). | Rice (Kolamb), 11th November 1895; followed by | 16 | 2,025 | 72 | 2,645 in husk. | 3,104 bundles. |
| 121 | Do. ( do. ) *Mr. Pránlál Harkisandás, District Deputy Collector.* | Do. | Do. | Do. ... | Dolichos lablab (Val) and Crotolaria juncea (San), 18th March 1896. | 10 | 450 | 35<br>5 | 92<br>455 | 480 leaves; 240 stalks. |
| 122 | Do. (Thála) ... | 130 | 1 3 | 8 8 0 | Rice (Kada), 24th October 1895, followed by | 14 | 1,770 | 130 | 2,290 in husk. | 4,640 |
| 123 | Do. ( do. ) ... *Mr. A. B. Fforde, Asst. Supt., Guj. Rev. Survey.* | Do | Do. | Do. | Dolichos lablab (Vál), 5th March 1896. | ... | ... | ... | 1,157 | 555 |
| 124 | Do. (Harangám)... *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | 261 | 1 8 | 12 0 0 (4 8 0 water-rate). | Rice (Sukhvel), 13th November 1895; followed by | 8 | 1,010 | 127 | 1,238 in husk. | 6,880 |
| 125 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál), 18th March 1896. | 6 | 265 | 60 | 347 | 270 leaves; 150 stalks. |
| 126 | Do (Bámanvel) ... *Mr. B Robertson, Assistant Collector.* | 11 | 1 8 | 10 0 0 (2 5 6 water-rate). | Rice (Kolamb), 12th November 1895. | 12 | 1,520 | 114½ | 1,813 in husk. | 6,830 |
| | *Do. (Bodwank) ..* | *261* | *6 13* | *12 0 0* | *Dolichos lablab (Vál), 8th March 1888.* | *11* | *485* | *67* | *315* | *1,280* |
| | *Do. (Ohod) ...* | *171* | *0 25* | *6 4 0* | *Do. 22nd March 1888.* | *17* | *770* | *95* | *875* | *2,700* |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | | Area of Test. | | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | | | Assessment excluding Local Funds. | | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | | | 13 | | 14 | 15 | | 16 | 17 | 18 | 19 |
| Rs. | a. | p. | Rs. | a. p. | Per cent. | A. | g. | Tolas. | Lbs. | Cwt. | |
| 76 | 8 | 4 | 10 | 0 0 | 13·06 | 0 | 5 | $37\frac{1}{2}$ | $38\frac{1}{8}$ | 400 bundles. | *Experiment Nos. 120 and 121.*—Second crop taken 6 years out of 10. *San* seed used as manure for rice. Incidence on the two crops comes to 11·31 per cent. |
| 11 | 13 | 9 | Do. | | 84·32 | 0 | 6 | Do. | $57\frac{1}{2}$ vál, 68 san seed | $1\frac{3}{8}$ leaves; $5\frac{5}{7}$ stalks. | |
| 51 | 1 | 5 | 7 | 14 6 | 15·47 | 0 | 4 | Do. | $51\frac{1}{2}$ | $6\frac{1}{4}$ | *Experiment Nos. 122 and 123.*—Price for *Kada* rice as well as *vál* taken by Mr. Pránlál very high. For reasons given in the analysis values altered. Incidence on the double crop 10·55 per cent. |
| 23 | 13 | 1 | 7 | 14 6 | 33·19 | 0 | 4 | Do. | $57\frac{1}{2}$ | $1\frac{3}{8}$ leaves. | |
| 41 | 3 | 10 | 10 | 0 0 | 24·24 | 0 | 6 | 35 | $34\frac{3}{4}$ | $13\frac{5}{7}$ | *Experiment Nos. 124 and 125.*—Field on higher level than the last and hence suffered to a greater extent from deficient rainfall. Incidence on the two crops 20·28 per cent. |
| 8 | 1 | 0 | 10 | 0 0 | 124·03 | 0 | 8 | $37\frac{1}{2}$ | $57\frac{1}{2}$ | $1\frac{3}{8}$ leaves; $5\frac{5}{7}$ stalks. | |
| 59 | 12 | 0 | 8 | 5 4 | 13·94 | 0 | 4 | 35 | $34\frac{3}{4}$ | 10 | *Experiment No. 126.*—No second crop this year. Incidence on rice alone. There is usually a second crop which is probably not good. |
| *8* | *7* | *0* | *1* | *14 4* | *22·47* | *0* | *6* | $37\frac{1}{2}$ | *62* | $3\frac{1}{2}$ | *Vál after rice. Incidence on second crop only. Second crop is usually not vál here but juvár. For further details vide Experiment No. 17 of Report for 1887-88.* |
| *26* | *11* | *6* | *10* | *0 0* | *37·43* | *0* | *4* | *Do.* | *52* | $2\frac{1}{2}$ | *Irrigated vál following rice. Incidence on the second crop only. For detailed remarks vide Experiment No. 18 of Report for 1887-88.* |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formula. | AVERAGE PER Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 127 | Chikhli (Fadvel) ... | 863 | 2 6 | 22 8 0 | Sugarcane (Malbari), 28th November 1895. | 18 | 5,690 | 1,875 canes. | 9,500 gol. | 1,360 bundles dry leaves. |
| 128 | Do. (Pipal Gabhán) | 58 | 3 36 | 41 0 0 | Do. ( do. ), 1st December 1895. | 16 | 4,875 | 1,875 do. | 8,160 do. | 1,280 do. |
| 129 | Do. (Ohod) ... | 299 | 1 22 | 25 8 0 | Do. ( do. ), 3rd December 1895. | 18 | 5,690 | 1875 do. | 9,260 do. | 1,240 do. |
| 130 | Párdi (Umarsádi) ... | 896 | 1 4 | 7 0 0 | Rice (Kada), 16th October 1895 ; | 16 | 1,950 | 127 | 2,132 in husk | 3,200 bundles. |
| | *Mr P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | followed by | | | | | |
| 131 | Do. ( do. ) ... | 896 | Do. | Do. | Dolichos lablab (Vál), 4th March 1896. | 16 | 710 | 60 | 809 | 573 leaves; 339 stalks. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 132 | Do. (Bálda) .. | 31 Pot No. 1 | ... 2 15 | ... 14 8 0 | Rice (Kada), 17th October 1895 ; | 14 | 1,710 | 74 | 1,837 in husk. | 3,300 bundles. |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | followed by | | | | | |
| 133 | Do. ( do. ) .. | Do. | Do. | Do. | Dolichos lablab (Vál), 5th March 1896. | 12 | 535 | 60 | 615 | 520 leaves : 330 stalks. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 134 | Do. (Sodhálváda) .. | 12 Pot No. 1 | ... 3 30 | ... 17 0 0 | Rice (Kada), 17th October 1895 ; | 12 | 1,460 | 81 | 1,656 in husk. | 3,600 bundles. |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | followed by | | | | | |
| 135 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál), 5th March 1896. | 5 | 220 | 60 | 244 | 240 leaves; 126 stalks. |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | | Incidence of Assessment on the Value of Gross Produce. | | | Principal Product. | By-Product. | |
| 12 | 13 | | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 465 10 5 | 10 7 5 | | 2·25 | 0 2 | 37½ | 21⅓ | 67 bundles. | *Experiment No. 127.*—Natural Bágáyat land growing rice followed by sugarcane every two or three years. |
| 413 3 2 | 10 8 2 | | 2·54 | 0 2 | Do. | 20⅔ | 67 do. | *Experiment No. 128.*—Sugarcane crop practically occupied the land for two years. The incidence on assessment for this period comes to 5·08 per cent. |
| 478 1 1 | 16 7 2 | | 3·44 | 0 2 | Do. | 20⅛ | 67 do. | *Experiment No. 129.*—*Bháta* land growing rice followed by sugarcane once in 5 or 6 years. |
| 43 7 6 | 6 5 9 | | 14·63 | 0 8·5 | Do. | 54 | 800 do. | *Experiment Nos. 130 and 131.*—Second crop always grown though field without any irrigational facility. Incidence on double crop 10·34 per cent. |
| 18 0 5 | Do. | | 35·27 | 0 8·5 | Do. | 57½ | 1⅜ leaves 5⅝ stalks. | |
| 36 2 5 | 6 1 8 | | 16·88 | 0 4 | Do. | 54 | 800 bundles. | *Experiment Nos. 132 and 133.*—Incidence of assessment on the double crop comes to 11·55 per cent. |
| 14 10 10 | Do. | | 41·58 | 0 8 | Do. | 57⅛ | 1⅜ leaves, 5⅝ stalks. | |
| 35 2 8 | 4 8 6 | | 12·88 | 0 4 | Do. | 54 | 800 bundles. | *Experiment Nos. 134 and 135.*—The incidence on both crops works out to 10·99 per cent. |
| 6 0 7 | Do. | | 75·06 | 0 7 | Do. | 57½ | 1⅜ leaves, 5⅝ stalks | |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Taluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot kharab. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 136 | Párdi (Palsána) ... | 19 | 1 10 | 12 8 0 (3 2 0 water-rate.) | Rice (Kada), 18th October 1895; followed by | 12 | 1,460 | 192 | 1,697 in husk. | 2,780 bundles. |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 137 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál), 6th March 1896. | 9 | 400 | 60 | 555 | 415 leaves; 240 stalks. |
| | *Mr. F. X. D'Souza, Assistant Collector.* | | | | | | | | | |
| 138 | Do. (Párdi) .. | 501 Pot No. 6 | ... 0 9 | 2 0 0 (0 4 6 water.) | Rice (Dángi), 27th October 1895; followed by | 16 | 1,950 | 96 | 2,309 in husk. | 4,200 bundles. |
| | *Mr. P. R Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 139 | Do. ( do. ) .. | Do. | Do. | Do. | Dolichos lablab (Vál), 10th March 1896. | 8 | 355 | 60 | 427 | 427 leaves; 169 stalks. |
| | *Mr Pránlál Harkisandás, District Deputy Collector.* | | | | | | | | | |
| 140 | Do. (Umarsádi) ... | 589 | 1 17 | 13 8 0 (4 0 0 water.) | Rice (Kada), 22nd October 1895; followed by | 18 | 2,275 | 130 | 3,346 in husk. | 2,784 |
| | *Mr. P. R Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 141 | Do. ( do. ) ... | Do. | Do. | Do. | Dolichos lablab (Vál), 3rd March 1896. | ... | ... | 60 | 783 | 1,440 |
| | *Mr. Umedrám Ranchoddás, District Deputy Collector.* | | | | | | | | | |
| | *Párdi (Balda)* ... | *43* | *0 14 (recognised share.)* | *2 2 0* | *Rice (Kada), 18th October 1886.* | *11* | *1,340* | *94* | *537 in husk.* | *1,146* |
| | *Do. (Párdi)* ... | *1,055* | *0 19* | *3 12 0* | *Do. 19th October 1886.* | *16* | *1,950* | *94* | *1,444 do.* | *2,853* |

*Surat District, 1895-96*—continued.

are of the Original Survey.

| Acre. | | | | | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | Area of Test. | Equivalent in Tolas of local weight Ser. | Principal Product. | By-Product. | |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | A. g. | Tolas. | Lbs. | Cwts. | |
| 34 14 1 | 10 0 0 | 28·66 | 0 4 | 37½ | 54 | 800 bundles. | *Experiment Nos. 136 and 137.*—Incidence on the double crop 20·97 per cent. |
| 12 12 7 | Do. | 78·20 | 0 8 | Do. | 57½ | 1⅜ leaves, 5⅝ stalks. | |
| 53 13 11 | 8 14 2 | 16·49 | 0 4 | Do. | 47½ | 800 bundles. | *Experiment Nos. 138 and 139.*—Superior rice on favourably situated land. Incidence on the double crop 13·79 per cent. |
| 10 8 6 | Do. | 84·37 | 0 9 | Do. | 57½ | 1⅜ leaves, 5⅝ stalks. | |
| 68 15 2 | 9 7 7 | 13·74 | 0 10 | Do. | 51½ | 6¼ | *Experiment Nos. 140 and 141.*—Very favourably situated field. Values of grain given by experimenter very high. Figures altered as explained in the analysis. Incidence on the double crop 10·75 per cent. |
| 19 3 0 | Do. | 49·21 | 0 12 | Do. | 57½ | 2 | |
| *12 6 10* | *6 1 1* | *48·82* | *0 6* | *37* | *50* | *6* | *Rice alone usually grown on the land. Season unfavourable. For other remarks, vide Experiment No. 13 of Report for 1886-87.* |
| *33 6 1* | *7 14 3* | *23·63* | *0 9* | *Do.* | *50* | *5¾* | *Do. do. vide Experiment No. 14 of Report for 1886-87.* |

*Summary of Crop Experiment Reports,*

Figures in columns 5 and 13

| No. | Táluka, Village and Experimenter. | Survey Number or Pot Number. | Net area excluding Pot Kharáb. | Assessment of the Field. | Crop and Date of Experiment. | Local Estimate in Annas. | Yield according to Formulæ. | Average per Seed. | Yield of Principal Product. | Yield of By-Product. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | *Mr. Syad Nuruddin Khán, Assistant Collector.* | | A. g. | Rs. a. p. | | Annas. | Lbs. | Lbs. | Lbs. | Lbs. |
| | *Párdi (Sukhes)* ... | *106* | *4 12* | *17 8 0* | *Dolichos lablab (Vál), 27th February 1890.* | *18 to 20* | *830 to 950* | *114* | *1,129* | *1,290* |
| | *Do. (Karáya)* ... | *136* | *9 2* | *6 8 0* | *Castor-seed, 21st February 1891.* | *12 to 14* | *340 to 390* | *44* | *455 seed.* | ..... |
| | *Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.* | | | | | | | | | |
| 142 | Do. (Umarsádi) ... | 512 | 2 36 | 3 4 0 | Do. 3rd March 1896. | 12 | 340 | 40 | 198 do. | ..... |
| | *Mr. Syad Nuruddin Khán, Assistant Collector.* | | | | | | | | | |
| | *Do. (Kumbhária)* ... | *131* | *2 21* | *2 4 0* | *Do. 27th February 1890.* | *12 to 13* | *340 to 370* | *38* | *320 do.* | *160* |
| | *Do. (Dungri)* ... | *284* | *9 16* | *6 8 0* | *Gram, 18th February 1891.* | *12* | *450* | *71* | *408* | *142* |
| | *Mr. F. X. D'Sousa, Assistant Collector.* | | | | | | | | | |
| 143 | Do. (Umarsádi) ... | 761 Pot No. 1 | ... 4 14 | ... 3 2 0 | Elusine coracana (Nágli), 27th October 1895. | 14 | 1,050 | 2½ | 1,184 | ..... |
| 144 | Do. (Palsána) ... | 61 | 4 12 | 6 10 0 | Do. 28th October 1895. | 12 | 900 | 6 | 827 | ..... |
| 145 | Do. (Sukhláo) ... | 171 | 0 38 | 0 15 0 | Do. 29th October 1895. | 16 | 1,200 | 5 | 1,845 | ..... |
| 146 | Do. (Kachwál) ... | 214 | 7 18 | 14 12 0 (6 12 0 water-rate.) | Sugarcane (Malbári and Kálibhuri), 6th December 1895. | 16 | 4,500 | 1,500 canes. | 9,460 gol. | 900 bundles dry leaves. |
| 147 | Do. (Panchlái) ... | 341 Jiráyat. | 1 36 1 13 | 2 12 0 0 12 0 | Do. (do.), 8th December 1895. | 20 | 6,000 | 1,500 do. | 10,020 do. | 860 do. |
| 148 | Do. (Palsána) ... | 60 | 1 27 | 22 8 0 (8 6 0 water.) | Do. (do.). 9th December 1895. | 16 | 4,500 | 1,500 do. | 8,320 do. | 1,060 do. |
| 149 | Do. ( do. ) ... | 363 | 5 14 | 39 0 0 | Do (Malbári and Khajuria), 10th December 1895. | 12 | ... | 1,500 do. | 5,620 Sántas or 9 háth canes. | 1,000 do. 2,000 stumps. |

*Surat District, 1895-96*—concluded.

are of the Original Survey.

| Acre. | | | | Area of Test. | Equivalent in Tolas of local weight Ser. | Prices of Produce per Rupee. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Total Value of Produce. | Assessment excluding Local Funds. | Incidence of Assessment on the Value of Gross Produce. | | | | Principal Product. | By-Product. | |
| 12 | 13 | 14 | | 15 | 16 | 17 | 18 | 19 |
| Rs. a. p. | Rs. a. p. | Per cent. | | A. g. | Tolas. | Lbs. | Cwts. | |
| *22 5 3* | *4 1 1* | *18·21* | | *0 8* | *37* | *57* | *4½* | *Second crop after rice. Incidence on the vál alone. For remarks, vide Experiment No. 21 of Report for 1889-90.* |
| *17 15 11* | *0 11 5* | *3·99* | | *0 8* | *Do.* | *25⅕* | ... | *Second crop after rice. Incidence on the castor-seed alone. For other remarks, vide Experiment No. 23 of Report for 1890-91.* |
| 8 4 0 | 1 1 11 | 13·57 | | 0 8 | 37½ | 24 | ... | *Experiment No. 142.*—Castor alone on poor soil. |
| *16 1 1* | *0 14 4* | *5·54* | | *0 8* | *37* | *20* | ... | *Castor on poor soil growing castor and kodra in alternate years. Vide Experiment No. 22 of Report for 1889-90.* |
| *13 12 0* | *0 11 0* | *5·00* | | *0 8* | *Do.* | *30 6/13* | *4* | *Grown after a year's fallow on black soil usually growing castor once in two years. Vide Experiment No. 22 of Report for 1890-91.* |
| 29 3 9 | 0 11 6 | 2·45 | | 0 4 | 37½ | 40½ | ... | *Experiment No. 143.*—This and the following two *nágli* crops are representative of the crops grown by the better cultivators. *Káliparaj* men with little tillage grow inferior crops. |
| 20 6 11 | 1 8 8 | 7·54 | | 0 8 | Do. | 40½ | ... | *Experiment No. 144.*—Field unmanured for the last three years. |
| 45 8 10 | 0 15 9 | 2·16 | | 0 8 | Do. | 40½ | ... | *Experiment No. 145.*—Sheep and goats folded on the field for 2 months which accounts for the high yield obtained. |
| 468 8 9 | 1 15 8 | 0·42 | | 0 2 | Do. | 20⅗ | 100 bundles. | *Experiment No. 146.*—*Bháta* land enriched with 400 cart-loads per acre of tank mould and fresh soil from a mango grove put on before beginning to grow cane. |
| 503 13 7 | 0 9 0 | 0·11 | | 0 2 | Do. | 20¼ | 100 do. | *Experiment No. 147.*—The crop practically occupied the land for two years. Incidence calculated on this period would work up to 0·22 per cent. |
| 447 7 7 | 13 6 11 | 3·00 | | 0 2 | Do. | 19 | 100 do. | *Experiment No. 148.*—Sugarcane grown every 4 or 5 years. At other times rice followed by *vál.* Crop damaged by jackals. |
| 208 3 2 | 7 4 8 | 3·50 | | 0 1 | ... | 28⅘ | 100 do. 400 stumps. | *Experiment No. 149.*—Object of the experiment to find the actual seed-rate, &c., for cane. See detailed remarks in the analysis. |